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Margo D. Sutton
University of San Francisco, mdabell@usfca.edu

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Margo Sutton RN, MS, CNS, DNP

Doctorate in Nursing Practice Student

University of San Francisco

School of Nursing and Health Professions

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Stefan Rowniak PhD, RN, MS, FNP

Committee Chairperson

Alexa Curtis PhD, FNP-BC

Committee Member

Jo Loomis DNP, RN, FNP-C, CNL, NCMP

Committee Member

Section I: Abstract

The prevalence of type 2 diabetes mellitus (T2DM) has increased substantially in the United States in recent years. Teaching self-management to diabetic patients is essential to help them control their chronic disease. Albert Bandura's theory of self-efficacy is commonly used in chronic disease self-management programs and is the theoretical framework upon which this Doctor of Nursing Practice (DNP) pilot project was built.

This evidence-based change in practice project took place in a rural primary care clinic in the central valley of California, and involved the development of a diabetes logbook, which was a tool for patients to use to learn self-management of their disease. The logbook was created in response to an identified gap in knowledge among patients at the clinic. The book was composed based on current evidence in diabetes management and treatment. It was introduced to the patients and a validated tool (Diabetes Self-Efficacy Scale) was used before and after the project to determine the patients' self-efficacy scores. The project implementation took place over a three-month period of time.

Though the number of project participants was small, and difficulties were encountered with follow-up with some patients, overall the pilot project was successful at increasing self-efficacy scores, with a mean pre-project score of 7.57, and a mean post-project score of 8.08, which is an increase of 0.51. The mean Hemoglobin A1c (HbA1c) pre-project was 8.75, and the mean HbA1c post-project was 8.19, indicating a decrease of 0.56. Any decrease in A1c can be seen as clinically significant, as even small reductions can decrease short and long term complications of diabetes.

This evidence-based change in practice project met its objective of increasing patients' perception of diabetic self-management. This project was designed to be translatable to other

primary practice settings. Sharing tools that are developed based on the current evidence will help to improve all patient healthcare outcomes.

Key Words: *Type 2 diabetes, disease self-management programs, diabetes in minority populations, chronic disease management*

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Section II: Introduction

Background Knowledge

Type 2 Diabetes Mellitus (T2DM) is a complex, chronic illness that has been increasing at an exponential rate in recent years in the United States. It is estimated that T2DM will affect 53 million Americans by 2025 with medical costs of approximately half a trillion dollars annually, and will reach a prevalence of 33% by 2050 (Rowley & Bezold, 2012; Boyle, Thompson, Gregg, Barker, & Williamson, 2010). The financial burden on individuals and society for the care of diabetic patients is tremendous, with the current direct medical cost for diabetes approaching $306 billion dollars per year (Herman, 2013).

The diabetes epidemic is not limited to the United States: the World Health Organization (WHO, 2015) estimates that by the year 2030, diabetes will be the seventh leading cause of death globally. Part of the increase in T2DM has been attributed to the epidemic of obesity, sedentary lifestyle, and an aging population (Glazier, Bajcar, Kennie & Willson, 2006). It is estimated that 33% of adult Americans and 17% of U.S. children and adolescents are obese (CDC, 2015).

Minority populations including Hispanics, African-Americans, and Native Americans have a higher percentage of diabetes in their populations. The rate of T2DM among U.S. Hispanics has increased by 46% from 1997 to 2011 and 12.8% of Latinos have type 2 diabetes compared to 7.6% of non-Latino Caucasians (CDC, 2015). Additionally ethnic minority groups, including those with chronic disease, are less likely than Caucasians to receive the health services that they need (Smedley, Stith, & Nelson, 2003).

Type 2 diabetes can lead to emotional and financial burdens and cause complications including cardiovascular disease, end-stage renal disease, blindness from retinopathy and amputations of extremities. Those with diabetes have an approximately two-fold risk of vascular

disease, including ischemic strokes and myocardial infarctions, compared to the general population (Sarwar et al., 2010).

According to the American Diabetes Association (ADA, 2014), the diagnosis of T2DM can be made by measurement of the hemoglobin A1c (HbA1c), fasting plasma glucose or from an oral glucose tolerance test. If the A1c is $\geq$ 6.5%, the fasting glucose is $\geq$ 126 mg/dL or the blood glucose is $\geq$ 200 mg/dL 2 hours-post glucose load with an oral glucose tolerance test, the person is considered to have diabetes. Additionally, a diagnosis of diabetes can be made if the person is having classic symptoms of hyperglycemia (polydipsia, polyphagia, polyuria) with a random serum glucose $\geq$ 200 mg/dL.

The HbA1c has been recognized as a standard of measure in the diagnosis and treatment of diabetes and an A1c of 7% or less is correlated with a reduction in diabetic complications (ADA, 2014). Each percentage point decrease in HbA1c over ten years is correlated with a 21% reduction in deaths related to diabetes, 14% for myocardial infarctions and 37% for micro-vascular complications (Turner, et al., 1998).

The American Diabetes Association 2014 treatment guidelines for diabetes include an annual dilated eye exam, a yearly comprehensive foot exam, and annual urine micro-albumin testing. Recommended periodic testing includes a lipid panel, kidney function tests, and HbA1c testing at least twice per year. The A1c should be tested quarterly if the value is not within range or if modifications to the treatment plan are made. Blood pressure and body mass index measurements are recommended at each provider visit. Routine vaccinations for diabetics include influenza and pneumonia vaccines. An ongoing assessment of the patient's psychosocial status should be part of medical management, with appropriate referrals when necessary.

Along with a target A1c of < 7.0%, pre-prandial glucose should be between 80 and 130 mg/dL, and post-prandial glucose one or two hours after a meal should be < 180 mg/dL. These are guidelines, and the practitioner always needs to take individual variability into account, including whether or not the patient has had severe hypoglycemic episodes in the past.

There are many reasons why diabetics may not effectively self-manage their disease, including low health literacy, financial inability to pay for medications or health provider appointments, not knowing potential complications of unmanaged diabetes, lack of social support and depression or other psychological illness. Furthermore, in minority populations, lack of access to care, potential lack of transportation, and not speaking English are additional barriers to managing diabetes (Glazier et al., 2006).

Without a comprehensive model for primary care, which includes creating the impetus for self-management of diabetes, the cost and burden to individuals and society will continue to spiral out of control. Additionally, with the passage of the Affordable Care Act (U.S. Department of Health and Human Services, Patient Protection and Affordable Care Act, 2010), many people with chronic disease now have health insurance and access to care. Many of these have been without medical care for years, and may have undiagnosed or untreated diabetes, as well as other chronic diseases. Healthcare providers must be able to meet the needs of this medically underserved population.

Local Problem

The rise of T2DM across the U.S., and especially in California is linked to the rising population of ethnic minorities, as well as the rise in obesity rates. According to the California Health and Human Services Data Portal, 40% of California's medically obese population is of Hispanic origin. Additionally, childhood obesity rates are on the rise and researchers estimate

that at least 30% of boys and 40% of girls born in the year 2000 will be diagnosed with diabetes in their lifetime. It is also predicted that by 2023, Californians will be burdened with more than 4 million cases of chronic disease, at a cost of approximately $19 billion annually, and almost $100 billion in lost productivity (California Health and Human Services [CHHS], 2015).

According to the Stanislaus County Public Health site (Stanislaus County Health Services Agency [SCHSA], 2015), as of 2013, the percentage of the Latino population in Stanislaus County was 42.5%, compared to 38% in California overall. One reason for this fact is the large number of Latino migrant laborers who come to work in the agricultural industry in the San Joaquin Valley.

The Stanislaus County Department of Public Health states that type 2 diabetes is a growing problem. From 2003-2005 (most recent data), the percentage of diabetics in Stanislaus County increased from 5.9% to 9.4%. This is in comparison to California, which had an increase from 6.6% to 7.0%. Therefore, the rate of growth of diabetes in Stanislaus County is higher than for California, and may be due in part to the large Hispanic population that resides there, as well as the increasing percentage of obese adults (SCHSA, 2015). As of 2008, the percentage of obese adults in Stanislaus County was 33%, compared to 23.3% in California (SCHSA, 2015).

The Agency for Healthcare Research and Quality (AHRQ) provides data on Prevention Quality Indicators (PQI) both at the state and county level for diabetes. The four PQIs for diabetes include short-term complications, which had an average of 56.1 cases per 100,000 population for California, compared to an average of 99.4/100,000 in Stanislaus County; long-term complications, which had an average of 107.4 in California compared to 147.3 in Stanislaus County; amputations of lower extremities, which had an average of 16.1 in California compared to 21.9 in Stanislaus County; and uncontrolled diabetes, which had an average of 9.2 cases in

California compared to 19.4 cases in Stanislaus County (see Appendix A). These statistics show a need for increased preventive medical care and better management of chronic disease in Stanislaus County.

Golden Valley Health Center (GVHC) is a Joint Commission-Accredited, private, nonprofit, Federally Qualified Health Center, serving Merced and Stanislaus Counties in California. It is a community-based healthcare organization offering medical and dental care, behavioral health services, and health education. Part of the mission of GVHC is to provide care for everyone, regardless of culture, language spoken, or ability to pay. They serve many of the medically uninsured and underinsured, low-socioeconomic status, and ethnic minority populations in rural Merced and Stanislaus Counties.

Gap Identified

Many of the clients at GVHC have chronic health conditions, including type 2 diabetes. At this point in time there is no formal logbook being used in the practice at GVHC. They do have blank sheets of paper with the title "glucose log", for patients to record their blood sugars, but this log is not given to every diabetic patient. There is no consistency on how each primary care provider furnishes care to their chronic disease patients. Some may have their diabetic patients return in two weeks with a recorded glucose log, if the patient's A1c is high, whereas other providers may not have their patient return for another three months or longer. There is no uniformity in terms of the diabetic teaching, or information given to patients regarding their disease. It is recommended that patients be referred to a health educator within the organization, but this is not routinely done; additionally, diabetic patients should have an annual referral for a podiatry exam and a dilated retinal exam, but these referrals are not always completed.

There is a diabetologist, an internal medicine physician with a subspecialty in endocrinology, who works at the clinic. Providers can refer their more difficult cases to this physician. However, this physician is not able to see every patient whose diabetes is not well controlled. If more consistent processes are put in place to help the primary care providers and their patients to manage their diabetes, then the overall management and health of the patients will improve. Part of this need is for the patients at GVHC to learn better self-management of their diabetes through written information and education.

Intended Improvement

AIM Statement

The intended improvement with this Doctor of Nursing Practice (DNP) Evidence-Based Change in Practice Project is to improve self-efficacy in patients with type 2 diabetes in order to help them with self-management of their disease. Self-efficacy is described as the confidence and the ability to achieve certain actions or goals (Bandura, 1977). In this case self-efficacy involves patients having the confidence and knowledge to manage their blood sugar, including hypoglycemia events, to keep track of lab values, including HbA1c, lipid levels, blood pressure, and annual exams.

The intended improvement is that within three months, the type 2 diabetic patients, ages 18-64 years, in Sarita Kumar FNP's practice at Golden Valley Health Center Clinic, with a HbA1c > 7 % will have utilized the diabetic logbook to keep track of appointments, annual exam dates, current medication regimens, and blood sugars. By using this tool, patients will feel empowered to self-manage their diabetes and will have a higher self-efficacy score, as well as experience an improved quality of life and better control of their disease management, as measured by a pre- and post-intervention survey. Incidental to this intervention, it is hoped that

by these patients being empowered to better self-manage their disease, there will be a decrease seen in the HbA1c. The question this test of change is attempting to answer is: will there be an increase in patient's perception of self-management of their diabetes with this evidence-based change in practice project?

Review of the Evidence

This literature review was undertaken to search for the best evidence regarding self-efficacy and self-management in patients with type 2 diabetes. The Johns Hopkins Nursing Evidence-Based Practice Appraisal Tool (The Johns Hopkins Hospital/The Johns Hopkins University, 2012 – see Appendix B) was used to evaluate the literature for studies with the strongest evidence. According to this Appraisal Tool, Level 1 is the highest in regards to strength of evidence and includes Experimental Study (Randomized Controlled Trials) and Meta-Analyses of Randomized Controlled Trials. Level 2 includes Quasi-Experimental Studies, which involves manipulation of an independent variable, but lacks randomization to groups or a control group. Level 3 involves Non-Experimental studies, Qualitative Studies, and Meta-Syntheses.

A literature search was undertaken in PubMed, Cinahl and Academic Search Complete using the search terms "type 2 diabetes self-management", "type 2 diabetes and self-efficacy", and "type 2 diabetes in minority and underserved populations". Inclusion criteria for articles were articles written in English, targeted to ethnic/minority or medically underserved populations with type 2 diabetes, at least 18 years old, and with an intervention directed at self-management of diabetes. Additionally, only articles that were available as full text through the University of San Francisco (USF) library were considered.

Three meta-analyses were found in the search process and are included in this review as part of the process of evaluating and synthesizing the evidence from the literature. According to the Johns Hopkins Appraisal Tool, meta-analyses are one of the strongest levels of evidence: Level 1. The majority of the studies included in the meta-analyses are randomized controlled trials (RCTs) and controlled trials. These findings are reported in chronological order, with the earliest studies presented first.

The primary outcome in most of these studies is change in HbA1c, with secondary outcomes of improved lipid profile, improved blood pressure, and improvements in the number of annual dilated eye exams, and annual foot exams. Outcomes also looked at self-monitoring of blood glucose, adherence to diet, exercise, and taking diabetic medications. Most of the interventions incorporate the idea of cultural competence.

Cultural competence is described as using familiar language and cultural norms to reach ethnic populations when engaging with them. As described by Nam, Janson, Stotts, Chesla, and Kroon (2012), cultural competence in a self-management program means integrating cultural beliefs, values and customs, family support, and familiar foods, language, and health practices.

Findings

A meta-analysis by Nam et al. (2012) looked at the effects of a culturally tailored diabetes education (CTDE) program in ethnic minorities with T2DM. The objective of the meta-analysis was to see if use of a CTDE had an effect on HbA1c. Twelve studies met the inclusion criteria: RCTs between 1990 and 2009, English language studies, studies that had an educational intervention targeted to minority groups with T2DM and studies that reported HbA1 levels pre- and post-intervention. An effect size (ES) was calculated based on the difference in HbA1c between intervention and control groups. A random effects model was used to calculate mean

differences with 95% confidence intervals. The random effects model was used due to the differences in study participants, interventions and outcomes.

Since there were differences among studies, three subgroup analyses were performed: the first subgroup analysis was performed using the baseline HbA1c, the second subgroup analysis was done using the intervention setting, and the third subgroup analysis used intervention length, from three to twelve months. The researchers also tested for heterogeneity and publication bias.

The 12 studies in this meta-analysis included a total of 1495 participants. Demographic data indicates the mean age of the participants was 63.6 years and 68% of them were women. All of the 12 studies included ethnic minority groups and the average baseline HbA1c was 8.6%. Most of the studies were performed in the U.S. and the mean sample size was 124.

The educational interventions were done in group sessions, or a combination of group and individual sessions. The control groups were either usual care or a minor intervention, in comparison to the treatment groups. The educators included a variety of job descriptions, from registered nurse to certified diabetes educator to pharmacist. Length of the intervention ranged from one to twelve months and the setting varied from community-based to hospital-based clinics.

All of the studies in this meta-analysis included interventions that were culturally focused. Depending on the ethnic group (Latino, African-American, Asian) the interventions included information on diet, exercise, and self-management of diabetes as well as including family members. The written materials were in the primary language, if not English, and visual aids were utilized to help those with low literacy.

After the intervention, most of the studies showed a reduction in HbA1c from baseline levels. The pooled effect size of the studies was a -0.29 reduction in HbA1c (CI 95%, -0.46 to -

0.13). This indicates the interventions were effective in reducing A1C in ethnic minority groups using culturally tailored educational interventions. The largest change in A1c in the intervention groups was seen at six months (ES -0.41, 95% CI, -0.61 to -0.21). The changes in A1c at three and twelve months were not significant. Additionally, the participants who had a baseline HbA1c $\leq$ 8.5% had a larger decrease in A1c than those with a baseline HbA1c > 8.5%. The reasons for this are unclear.

The authors concluded that the culturally tailored diabetes education programs in the trials in the meta-analysis did show benefit in reducing the HbA1c. The strengths of this study include the meta-analysis, the inclusion of RCTs, with studies that targeted minority populations, and the statistical analyses that looked at effect size, heterogeneity, and bias, such as publication bias. The weaknesses include the fact that no other outcomes were examined, besides HbA1c, so it is unknown if other effects, such as diabetes knowledge, diabetes self-management, blood pressure, and lipid panels were improved. Also, since the majority of the participants were older females, the generalizability of the studies comes into question.

A meta-analysis and meta-regression done by Ricci-Cabello, et al. (2014) examined the literature to determine which self-management programs were most effective in ethnic minority groups with type 2 diabetes. Thirty-seven studies were identified for inclusion in the meta-analysis, 20 of which were randomized controlled trials. Most of these studies took place in the U.S. and included ethnic populations of African-Americans, Latinos, Asians, Alaskan-Eskimos, and multiethnic groups. The majority of the interventions took place in the setting of a primary care office or clinic and included group, one-on-one teaching, or both. Didactic and situational problem solving were the most commonly used teaching methods. Educational content included diet, exercise, self-monitoring of blood glucose, diabetes knowledge, medication adherence, and

psychosocial information. Most of the studies were culturally tailored to ethnic minorities and there were a mixture of educators in the interventions, from nurse to dietician to physician. The average length of the intervention was 8.2 months with a mean duration of ninety minutes per session.

The outcomes of the interventions were measured by an increase in diabetes knowledge, and diabetes self-management behavior that included diet, exercise, blood glucose monitoring, and foot self-examination. Clinical outcomes measured HbA1c, body mass index, and blood pressure. The researchers gathered the average HbA1c from each trial. Confidence intervals of 95% were calculated using random effects models. Heterogeneity and publication bias were also quantified.

The RCTs, with a total sample of 3,094 patients, showed a reduction in HbA1c of -0.31% (95% CI, -0.48% to -0.14%). The interventions in diabetes self-management included educational content regarding diet, exercise, self-monitoring of blood glucose, medication adherence, and basic diabetes knowledge. Meta-regressions showed a bigger reduction in HbA1c in those studies that involved individual rather than a group intervention, and face-to-face rather than technological interventions. Additionally, studies that involved peer educators, were based on cognitive reframing techniques, and those that had a lower number of teaching methods were more successful in achieving desired outcomes. The strength of this review is that it includes a meta-analysis and meta-regression utilizing randomized controlled trials. Weaknesses include no long-term follow-up, and no cost-effectiveness studies.

A Cochrane Review (Attridge, Creamer, Ramsden, Cannings-John & Hawthorne, 2014) examined culturally appropriate interventions for ethnic minority groups with type 2 diabetes. The inclusion criteria for articles in this systematic literature search included randomized

controlled trials, type 2 diabetics, and participants who were from ethnic minority groups in countries with a similar standard of living to the United States.

A total of 33 studies were included in the review, with 7453 participants. In 14 of the trials (1442 participants) there was a reduction in HbA1c by -0.4% (CI 95%, -0.5 to -0.2), at three months, after a culturally appropriate intervention. Additionally, in 14 of the trials, there was a six month reduction in HbA1c of -0.5% (CI 95%, -0.7 to -0.4), although the mean difference in A1c lessened at twelve and twenty-four months. These statistics are post-intervention and in comparison to a group who received usual care.

The interventions in the studies were too heterogeneous to group, but the included studies used culturally competent health education. There was no significant increase in quality of life seen in these studies, in comparison to treatment as usual. Knowledge about diabetes did show improvement at three, six, and twelve months. An initial reduction in triglycerides was seen at three months, but did not maintain at six or twelve months. Other lipid profiles did not improve relative to the control group (low density lipoprotein, high density lipoprotein, total cholesterol). Additionally, markers of blood pressure, body mass index, self-efficacy, and empowerment were not statistically different from the control group.

The authors concluded that short term and medium term effects (three and six months) did show a reduction in HbA1c, increased knowledge about diabetes, and living a healthy lifestyle through the use of culturally competent interventions in the trials.

The strength of the Cochrane Review is the large amount of studies that were looked at by the authors, as well as the inclusion of studies that incorporated cultural competence. The fact that the interventions were varied, making it difficult to compare across studies, does not allow for conclusions to be drawn as to which intervention worked best. Subjective measures in the

studies were self-reported by participants, leading to possible bias in this regard. Additionally, because of the nature of the interventions, researchers and participants were rarely blinded, leading to the risk of performance bias. No long-term follow-up was done, so the sustainability of these outcomes is questionable. Also, there were no economic analyses to determine what the reduction in cost in healthcare would be if the implementation of the interventions led to better diabetic outcomes.

Conclusions

There are a multitude of factors that influence chronic disease management, from the patient's ability to self-manage, levels of self-efficacy, whether or not the patient has social support, and whether or not the patient has some form of psychological illness. Also, having processes in place at the clinic, including interdisciplinary management and education of clinicians, is imperative to the management of chronic disease (Corser & Yin, 2009). The use of culturally competent care, including being familiar with the language and culture, can only enhance care, and help to reduce health disparities. Through review of the literature on diabetes self-management, it can be seen that there has been some success in populations, including ethnic minorities, in reducing HbA1c, increasing diabetes knowledge, and increasing self-care activities, especially with the use of culturally tailored diabetes self-management programs.

The A1c was the primary outcome in most of the studies, although other outcomes also had positive effects, including patient knowledge about diabetes, increases in self-care activities such as blood glucose monitoring, adhering to a diabetic diet, exercise, and follow-up with health providers. In addition to being culturally competent, the studies that had the biggest impact on outcomes were individualized, face-to-face interventions, rather than computerized or utilizing

technology. Reasons for this may include low technology literacy, barriers to accessing these technologies and language barriers in these populations.

The sustainability of the results was not seen in these studies, as most of the quantifiable results diminished by 12 months. Further research needs to be done, specifically RCTs, to determine which interventions work best for diabetes self-management programs in ethnic populations with type 2 diabetes. Additionally, quantitative and qualitative research needs to be done to determine how to sustain the intervention effects in studies.

However, there are limitations in doing controlled studies in a population already marginalized and not receiving appropriate healthcare. The question then becomes: is it ethical to withhold an intervention that may help an individual who already has limited resources? The logistics of designing such a study is something that will need to be carefully considered. It appears that outreach programs in communities, such as health fairs and use of community health workers, may be a compelling place to start to design these programs.

Diabetes Initiative

An initiative by the Robert Wood Johnson Foundation, called the Diabetes Initiative, was a national program conducted between 2002-2009 to improve self-management support for adults with diabetes in clinic and community environments. This Initiative sought to validate that diabetes self-management programs could be instituted in real-life community settings, based on research from academic centers and the current literature. The 14 health center sites for the Initiative included both urban and rural clinics, as well as sites with ethnic minorities and medically underserved populations.

The Initiative states that individuals need resources and support for self-management of diabetes. These include "continuity of quality clinical care, individualized assessment,

collaborative goal-setting, key skills for disease management and healthy behavior, ongoing follow-up and support, and community resources." One of the key lessons learned was that diabetes self-management is essential and can be successfully implemented in real-world models (Robert Wood Johnson Foundation, 2009).

Conceptual or Theoretical Framework

The theoretical framework most often used in disease self-management is the theory of self-efficacy by Albert Bandura (Jang, & Yoo, 2012; King et al., 2010; Walker, Smalls, Hernandez-Tejada, Campbell, & Egede, 2014). Bandura's work in social cognitive theory and self-efficacy promotes the idea that behaviors are a result of a person's belief in whether or not he has the ability to accomplish certain tasks or skills. This belief gives him the confidence to overcome any barriers that may present in his life and provides the motivation to perform self-care activities. This theoretical model allows the individual to assume responsibility for the care and management of his chronic disease through self-mastery, and the development of confidence in his ability to care for himself. It is a difficult and complex process to translate research into practice, and the lack of a theoretical foundation for this process is often the reason for failure (Eccles, et al., 2012). By implementing self-efficacy as a framework into this diabetic self-management program, it is hoped that the patients will gain the mastery and confidence needed to better manage their chronic illness.

Ethnic minorities and those who come from a low socioeconomic status tend to have less self-efficacy. The reasons for this are unclear but may include low self-worth and less confidence in ability as a result of coming from a disadvantaged background (Walker, Smalls, Hernandez-Tejada, Campbell, & Egede, 2014). It is important for practitioners to find ways to

enhance the self-efficacy of marginalized populations, so that they may reap the benefits of an improved quality of life.

Section III: Methods

Ethical Issues

As required by the University of San Francisco DNP curriculum, the online Institutional Review Board (IRB) training modules on Human Subject Assurance Training were completed (Appendix C). These training modules were developed by the U.S. Department of Health and Human Services (HHS). The purpose of the training modules is to allow the student to gain an understanding of the purpose of an IRB, and when an IRB approval is needed. According to the USF website, the purpose of an IRB is to "safeguard the physical, social, and emotional well-being of individuals" who are participants in a research project (University of San Francisco, 2015).

Prior to beginning the project, this student completed a DNP Project Approval Form including a Statement of Determination, which was reviewed and approved by the student's DNP chair and committee as an evidence-based change in practice project. Therefore this project was verified as a quality improvement project, not a research project, and the USF Institutional Review Board for the Protection of Human Subjects (IRBPHS) approval was not required.

According to the U.S. Department of Health and Human Services (2015), a quality improvement project "consists of systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups." Privacy of each of the patients was protected. No individual identifying information was linked to the surveys. This DNP student reports no conflict of interest in regards to this project. Participation in the project was voluntary.

The patients who participated in this pilot project were given the diabetic logbook, instructed on use of the book, and asked only to complete a pre- and post-survey. Since there were a limited number of logbooks printed for the pilot program, only those in whom the A1c was greater than 7% were given a logbook. Ideally, if the pilot project is a success, Golden Valley Health Centers will adopt the logbook to use clinic wide, and all diabetic patients at GVHC will have access to this resource.

Setting

The setting was a primary care clinic, Golden Valley Health Center, located in Modesto. Modesto is a city in the central valley of California, and according to the 2013 census, has an estimated population of 205,000 people. The median resident age is 33.9 years and the median household income, as of 2013, was $46,329. In Stanislaus County, which includes Modesto, 43.5% of the population is Hispanic (U.S. Census Bureau, 2015).

Golden Valley Health Clinics began in Merced, California in 1972 as a migrant worker health clinic. It has since grown into 26 sites, with 120 clinicians, at clinics in Merced and Stanislaus Counties (Golden Valley Health Centers). At the clinics there are multiple primary care providers, including physicians (MDs, DOs), nurse practitioners (NPs) and physician assistants (PAs). Each provider sees patients independently. The population consists mostly of low-income, minority and medically underserved populations. Each provider has two medical assistants (MAs), who are bilingual in English and Spanish, who place the patients in the rooms, obtain vital signs, set up appointments, and assist with translation.

Planning the Intervention

Many of the clients at GVHC have chronic health conditions, including type 2 diabetes. At this point in time there is no formal logbook being used in the practice at GVHC. This

provides an opportunity for a pilot quality improvement project to help the patients at GVHC, with type 2 diabetes, to better manage their chronic disease with the aid of a logbook. The plan for this Doctor of Nursing Practice (DNP) project was to introduce the logbook to approximately 20 patients in Sarita Kumar FNP's practice at GVHC, who are diabetic, between the ages of 19-64, and who have a HbA1c > 7 %, indicating poor glucose control. The project was discussed with and permission granted by the preceptor, Sarita Kumar, Family Nurse Practitioner (FNP), and the Director of the Family Practice clinicians at Golden Valley Health Center, Florida suites, Dr. Elaine Soriano.

Planning the intervention involved doing research on various diabetic logbooks. This writer found some good examples from the American Diabetic Association, the Wisconsin Diabetes and Prevention Program, the Canadian Diabetic Association and drug companies such as Lilly, Bayer, and BD. Based on ideas from these, a unique diabetic logbook was created in both English and Spanish (see Appendices D and E). The source for the diabetes target numbers and information regarding diabetes was the American Diabetic Association (ADA).

The logbook is essentially a diabetes self-management workbook. It contains information regarding blood sugar goals, blood glucose monitoring sheets, current medication regimen, how to recognize and treat hypoglycemia, and dates of last annual exams. Additionally there is space to keep track of provider appointments and for the patients to write down questions. There are instructions for patients to call the office if blood sugars remain consistently elevated for a specified period of time or if the patient is experiencing hypoglycemic episodes. This DNP student's role was as project manager and to educate the patients on how to use the logbook, with the assistance of the bilingual medical assistants for Spanish speaking patients.

It was anticipated that when the patient came in for his appointment with his healthcare provider, he would bring this log. Reviewing the log with the patient would also help the provider to track blood sugars, annual exams and current medications. Additionally, if a patient changed his provider, this guide would help the new practitioner to see, at a glance, what has been done for the patient and what medications he is currently taking.

A questionnaire was to be distributed to patients prior to the start of using the logbook to assess their self-efficacy and additional questions asked to determine how they feel about using a logbook. Research led to a Diabetes Self-Efficacy Scale created by the Stanford Patient Education Research Center (2003). This Scale is available in both English and Spanish and is free for anyone to use. This 8-item scale is a psychometrically validated tool to assess self-efficacy in patients with diabetes in an English version (Lorig, Ritter, Villa, & Armas, 2009) and a Spanish version (Lorig, Ritter, & Gonzalez, 2003). This scale has an internal consistency reliability of 0.828 for the English version and an internal consistency reliability of 0.854 for the Spanish version (See Appendices F and G). The additional questions proposed to the patients were: "Do you currently check your blood sugar every day?" (Yes or No), "Do you currently write down your blood sugar numbers?" (Yes or No), and "How comfortable do you feel using a daily logbook for your diabetes?" (Circle a number from 1 [very uncomfortable] to 10 [very comfortable]) (See Appendix H).

After several months of using the logbook, a post-survey questionnaire using the same Stanford Diabetes Self-Efficacy scale was to be given to the same patients to reassess self-efficacy and whether the log helped them to manage their diabetes. Additional questions to be asked at this time were: "Do you feel that using this logbook has helped you with managing your diabetes?" (Yes or No), and "How easy was it for you to use this logbook?" (Circle a

number from 1 [very easy] to 10 [very difficult]) (See Appendix I). Also, a space was given for the patient to write any comments or concerns. The logbook and the questionnaires were printed in both English and Spanish. In this pilot project, these were the two languages made available since a large percentage of the patients at GVHC are Hispanic. In the future, if the program is extended clinic-wide, additional languages may need to be considered.

Communication Matrix Plan

This DNP student was the project leader, with backing from Sarita Kumar FNP, and Dr. Elaine Soriano. The chair of the DNP committee was Dr. Stefan Rowniak, and the other committee members were Dr. Alexa Colgrove Curtis and Dr. Jo Loomis. This student reported directly to Dr. Rowniak and to Sarita Kumar FNP, while keeping the other committee members apprised of the project, including any changes or barriers to implementation. Any feedback from the chair and other committee members were evaluated and implemented in regards to this project. The DNP student kept all of the people involved in the dissemination of the project informed. This included the nurse practitioner, the medical assistants and the office supervisor. Having brief meetings at the beginning of the day was one method to ensure the flow of information and to clarify any questions or uncertainties about the project (See Appendix J).

Implementation

Implementation of the project started with translating the logbook from English to Spanish. This author asked the medical assistants to assist with the translation. The MAs were willing to help with this process and completed the translation within one week. To ensure the translation was correct, additional steps were taken, including use of an online translator, as well as having two native Spanish speakers who are high school teachers proofread the book and make corrections.

The next step of implementation involved getting the logbooks printed in both English and Spanish. A nearby printing service, associated with a national office supply store, was able to accommodate the printing of the books. The original idea was the have the logbook be a small, folded booklet that could be carried in a pocket or a purse. Challenges in the printing process made this format difficult, so instead the logbook was printed on 8.5 x 11 inch pages in a portrait format. The information was printed on both sides, in color, and had a comb-style black binding with a clear plastic cover. This arrangement worked well and allowed all of the information to be easily read and for the logbook to be useable.

Implementation of this DNP project included identifying patients with type 2 diabetes with a prior A1c > 7%. Sarita Kumar, FNP, and her MAs assisted in this process by scheduling diabetic patients on Tuesdays, which is the day this student was at the clinic. Patients could be selected as appropriate from this system. When a patient came in to the clinic, this DNP student saw the patient for his diabetic check, and then introduced the logbook to the patient. If the patient could only speak and understand Spanish, one of the MAs assisted with translation. At this time, the patient filled out the pre-project survey and questionnaire.

After several months of using the book, patients were scheduled to come in for a follow up appointment. At the follow up, this student spoke with the patients to see if they were using the logbook, and then had them fill out the post-survey and questionnaire. The patients then were instructed to have lab work done, as previously planned.

Planning the Study of the Intervention

Please refer to the Gannt chart in Appendix K for a diagram of the work breakdown structure. This chart was used as a template for the planning of the project. The first item on this timeline for the project was the development of the diabetes logbook. One month was proposed

for the research and development of this deliverable. Other logbooks were to be examined to determine what should be included in this logbook for diabetics, including information from the ADA, the New York Diabetes Coalition, Kaiser Permanente, and from such companies as Bayer Lilly. Additionally, the criteria put forth by the American Diabetes Association (2014) for recommended frequency of exams would be included in the logbook. The creation of both the English and Spanish versions of the book would be accomplished in this phase.

The next phase of the project would involve printing of the English and Spanish logbooks after finalization of the version to be used. This phase was estimated to take approximately one week, depending on the source for the printing. After completion of the printing, the workbooks would be checked for any errors.

The third task involved identifying patients in Sarita Kumar's practice who were candidates for the pilot project. Any type 2 diabetic, between the ages of 18 and 64, with a HbA1c > 7 % would qualify to participate in the project. Data on diabetic patients was to be found in the electronic health record used at Golden Valley Health Center (NextGen). An arbitrary number of 20 patients was an estimate of participants in the project. If during the identification phase, more or less participants were found, the number would be adjusted. The project was to be explained to the patients at the time they were given the pre-project questionnaire. Patients would be informed of the right to refuse to participate. A total of two months was designated as time for gathering information on patients and identifying which patients qualified to participate in the project.

The next phase would involve having the identified patients fill out the pre-project questionnaire. There are two parts to the questionnaire: the first part is the Diabetes Self-Efficacy Scale from the Stanford Patient Education Research Center. The second part of the

questionnaire involves questions related to whether or not they keep track of blood sugars and whether or not they believe a logbook would help them in this regard. This phase would be implemented concurrently with the next phase, which would be introduction to and education on the logbook. Education and explanations would be given in the patient's native language to ensure understanding. The bilingual medical assistants would help to deliver this information in Spanish. The patients would be instructed to call the office if they have any questions or issues. The timeframe for completing these two tasks was two months.

The final follow up was to be at two to three months. The patients would have their most recent labs, including HbA1c, which should have been done within one week of the follow up appointment. At the follow up, the patients would again be given the Diabetes Self-Efficacy Scale to fill out along with the post-project survey. Answers would be compared, pre- and post-project and HbA1c numbers would be gathered.

The final review would involve looking at the scales and the surveys to determine if the patients gained a better sense of self-efficacy through the project, and in managing their diabetes. Any comments from patients would be considered as qualitative information. The A1c numbers would also be examined to see if there were any decreases from the preceding A1cs.

Milestones were planned for and executed along the course of the project, including completion of the Qualifying Examination, which incorporated the culmination of the project prospectus and a manuscript of a literature review that was submitted for publication. Each deliverable was submitted to the DNP chair and committee and approval received before passing the Qualifying course.

Methods of Evaluation

According to Davidson (2010), there are six areas of evaluation questions. The first area for the focus of evaluation involves process: "how well was the project designed and implemented?" The second area for the evaluation is regarding outcome. Some of the questions asked in this area include "how well did the project meet the overall needs?" Also, "how valuable are the outcomes to the participants?" The third area of evaluation is "what was learned from this process?" "What worked and what did not?" "Were there any unintended consequences?" The fourth area of evaluation involves investment, both in time and money: "was the project cost effective?" "Could it have been done in a different way?" The fifth area of evaluation looks at what comes next: "can the project be shared and replicated elsewhere?" " Is it sustainable, or does it need continuing support?" The final area of evaluation, according to Davidson, is "determining whether the project has a theory of change, and whether the project informs the initial question." All of these focus areas are included in the final evaluation of this DNP project.

Reporting requirements included weekly updates given to the nurse practitioner. Additionally, periodic updates were given to the chair of the DNP committee, to ensure the project was on track and that if there were barriers, methods could be discussed for surmounting those barriers.

The evaluation for this quality improvement project was via the pre- and post-project questionnaires, which determined if there was an increase in self-efficacy and patient satisfaction in being able to effectively manage chronic disease. The Stanford Diabetes Self-Efficacy Scale was used as the pre- and post-project survey. This scale contains eight questions that ask how confident the patient feels about performing certain activities, in relation to his diabetes. The

scale is numbered from one to ten, with one being "not at all confident" and ten being "totally confident".

After the patient filled out the scale, it was scored and the mean number was tallied. This number was compared from the pre-project survey to the post-project survey. If the patients experienced an increase in self-efficacy, this should be reflected in the survey. When the pre-project questionnaire was given, three additional questions were asked: "do you currently check your blood sugar every day? (yes or no)", "do you currently write down your blood sugar numbers? (yes or no)" and "how comfortable do you feel using a daily logbook? (scale numbered 1 [very uncomfortable] to 10 [very comfortable])" When the post-project questionnaire was given, two additional questions were asked: "do you feel that using this logbook has helped you with managing your diabetes? (yes or no)" and "how easy was it for you to use the logbook? (scale numbered 1[very easy] to 10 [very hard])".

Additionally, the HbA1c levels were looked at to see if there was a reduction in the HbA1c levels of the patients who participated in the project. The A1c was compared to the patient's previous HbA1c from the prior three months.

Analysis

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

The SWOT analysis (Appendix L) examines the assurances and the opposing components of the project. Strengths of the project include support of the staff at Golden Valley Health Center, Florida suites, in the planning and implementation of the project. This includes support from Sarita Kumar FNP, Dr. Soriano, Dr. Ganupantula (the Diabetologist), and the assistance of the bilingual medical assistants. Additional strengths were the low cost and ease of implementation of the project at the clinic, and the diabetic patients who were receptive to

receiving and using the logbook. The evidence from the literature supporting implementation of a diabetes self-management project can also be seen as a strength.

Identified weaknesses include encountering patients who were not receptive to using the book, and difficulty with follow-up with some patients who were unable to be contacted by phone, or who didn't show up to scheduled appointments. An additional weakness for this project is that a few of the patients, after receiving the book, did not take the opportunity to read it or use it.

Opportunities for this project include the chance for patients to learn better self-management of their diabetes, to increase their diabetes knowledge, and to better control their diabetes as manifested by a decrease in their A1c. Additional opportunities include a chance for the clinic to use the logbook with all diabetic patients, and perhaps to evolve the book into a model for self-management of other chronic diseases, such as hypertension and heart failure.

Threats to the project were potential inability to fund the logbook, the difficulties encountered in translating and printing the logbooks, potential lack of provider or patient support, and not being able to follow-up with patients as predicted. Additionally, a threat to the project included a shorter time frame for the project than originally envisioned, and the fact that the student's preceptor had a planned three-week vacation, during which this DNP student had limited access to the preceptor. In the preceptor's absence, Dr. Soriano was available at the clinic. A contingency plan was made prior to the preceptor's departure to bring the patients in for their follow up appointment as a "nursing visit". A registered nurse, who works with the providers at the clinic, is able to schedule appointments with the patients to review glucose logs. In this way, this student could follow up with the patients to complete the post-project surveys.

Budget and Return on Investment Plan

See Appendix M for the Cost/Benefit analysis, and Appendix N for the Project budget. The cost of the project was minimal, and included the cost of the printing of the logbooks (approximately $400.00). Other services were voluntary, including the clinical hours given by this student, as well as the hours for translation and assistance provided by the medical assistants, and the schoolteachers who helped in the translation. Return on investment is difficult to determine, but the actual per capita Medicare spending for diabetes over one year, in the state of California was $18,513.00 (Centers for Medicare and Medicaid Services, 2012, most recent data). As mentioned previously, each percentage point decrease in HbA1c over ten years is correlated with a 21% reduction in deaths related to diabetes, 14% for myocardial infarctions and 37% for micro-vascular complications (Turner, et al., 1998); therefore by reducing the burden of disease through intervention, a reduction in complications and medical costs will be the result.

An analysis done by Zhong, Lin, Cohen, Winn, and Neumann (2015) included a systematic review of the literature for cost-utility analyses in diabetes. They concluded from their analyses that most diabetic intervention programs are recommended by practice guidelines and are cost-effective, with a potential for reduction in health care costs for the 7,117 patients in the studies, of $12.5 million and the gain of more than 1,938 quality-adjusted life years over the lifetime of these patients. That would mean a savings in healthcare costs of $1.756 million per diabetic person over the course of their lifespan, which if divided by forty years (assuming a patient is approximately forty years old and will live for another forty years), would mean a savings of $43,900 per year. At the very least, a portion of the $18,513 spent per capita on diabetic patients would be reduced. If this amount were multiplied by the number of diabetic patients in the state, a tremendous amount of money could be saved.

Section IV: Results

Program Evaluation/Outcomes

A total of twenty logbooks were distributed to diabetic patients with an A1c > 7%. The ages of the patients ranged from 33 to 64 years old. Fifteen of the patients were female, and five of the patients were male. Eleven of the patients were Hispanic, six were Caucasian, two were Asian and one patient was Assyrian. The actual implementation of the project took three months, from distribution of the logbook to follow up in the clinic.

Quantitative Results

The pre-project Diabetes Self-Efficacy scores had a range from 4.5 to 9.375, with a mean score of 7.57, and a median score of 7.75, based on twenty responses. The post-project Diabetes Self-Efficacy scores had a range from 7.0 to 9.75, based on eleven responses (some patients were lost to follow-up and some patients did not use the logbook and were excluded from the post-survey results). The change in the mean from pre- to post-survey was an increase of 0.51, and the change in the median from pre- to post-survey was an increase of 0.125 (See Appendices O and P).

The pre-project A1cs had a range from 7.2 to 11.1, based on twenty patients. The mean A1c was 8.75, and the median A1c was 8.55. The post-project range for A1cs was 7.1 to 11.5, based on eleven results. Again, some of the patients were lost to follow up and some had not yet completed their lab work. The post-project mean was 8.19, and the median was 7.8. This shows a difference in the mean of -0.56 and a difference in the median of -0.75 (See Appendices Q and R).

The pre-project questionnaire asked the patients if they checked their blood sugar every day. Twelve of the respondents said yes, seven of the respondents said no, and one respondent did not answer the question. The questionnaire also asked if the patients recorded their blood

sugars. Seven of the respondents answered yes, that they record their blood sugars, twelve of the respondents answered no, and one respondent declined to answer. Finally, the questionnaire asked how comfortable the patients felt about using a diabetic logbook (from 1 [very uncomfortable] to 10 [very comfortable]). The answers ranged from 1 to 10. The mean number was 6.17 and the median was 6.0 (Appendix S). These questions provided a baseline to see how many patients check their blood sugar, how many patients record their blood sugar, and how comfortable they feel using a logbook.

The post-project questionnaire asked the question: "do you feel that using this logbook has helped you with managing your diabetes?" Ten of the respondents answered "yes", one respondent answered "no", two patients did not use the logbook, one declined to answer, and six were lost to follow-up. The second question asked "how easy was it for you to use this logbook" (From 1 [very easy] to 10 [very difficult])? The range of answers was from one to ten, the mean was 5.5 and the median was 7 (Appendix T).

Further investigation may elucidate the reasons why patients felt the logbook did or did not help with managing their diabetes, and why they found the book easy or difficult to use.

Qualitative Results

A final question posed to the patients was whether or not they had any comments or concerns they would like to share with regard to the logbook. One patient wrote that using the logbook has "drastically" helped her with managing her diabetes. Another patient wrote "the logbook is my constant reminder – I have it with me at home so it reminds me to test, to check and read labels". One patient admitted she has not used the logbook because checking her blood sugar and writing it down makes her "too nervous". One patient liked the book so much that he asked for a second one.

Evaluation Process

Davidson's (2010) first area of evaluation involves process and asks "how well was the project designed and implemented?" The design of the project was evidence-based, used cultural competence and was designed to fill a gap in the practice at a Golden Valley Health Center Clinic. The implementation phase met with some obstacles, including translating the logbook, printing the book and following up with all of the patients. Future implementations could be improved based on lessons learned.

The second area of evaluation involves outcomes and asks "how well did the project meet the overall needs?" And also "how valuable are the outcomes to the participants?" The project met the overall needs of the clinic and patients as identified by the gap in practice. The outcomes are very valuable to the participants, because learning better disease self-management and improving self-efficacy may help to increase overall health and quality of life.

The third area of evaluation is "what was learned from this process?" "What worked and what did not?" and "Were there any unintended consequences?" What was learned from this project is that one must be flexible and adaptable when implementing a project. When things don't go as planned, there must be a contingency plan in place. What worked was that overall the logbook was well received by the patients and they were open to using it. Assistance from the FNP and from the MAs was crucial in helping this project to work. What didn't work well was follow-up with some of the patients. The policy at GVHC is that they do not charge patients if the patient does not come for a scheduled appointment. The philosophy of the organization is that most of the patient populace is struggling financially and they don't want to tax them further by imposing a monetary fine if they miss an appointment. The only negative is that there is no

consequence to missed appointments and therefore sometimes they have a high "no show" rate. In this project, no unintended consequences were identified.

The fourth area of evaluation involves investment, both in time and money. The questions asked here are "Was the project cost effective," and "Could it have been done in a different way?" This DNP project was cost effective. If the logbook is adopted for use in the clinic, the printing cost and cost of training the clinic staff would be minimal. The time investment would also be minimal, since the logbook has already been created. The return on investment for the clinic would be huge, especially if the government begins to pay primary care providers based on performance and quality indicators, as is done in acute care. Additionally the knowledge that what is being done for the patient is right may result in higher levels of job satisfaction among providers. It's possible the project could have been done in a different way. Diabetic education classes and outreach fairs are ways in which the project might have been implemented.

The fifth area of evaluation asks whether "the project can be shared and replicated elsewhere?" It also asks "is it sustainable, or does it need continuing support?" This project certainly could be shared and replicated in any primary care practice or practice managing chronic disease. Again, it is possible the book could evolve to include other types of chronic disease, such as heart failure and hypertension. Additionally, in the future the use of technology in disease management may be integrated into the process. This project is sustainable. The only continuing support it requires is printing of the books, and ongoing education and support of the primary care clinicians who are disseminating the information.

The final area of evaluation is whether "the project has a theory of change" and whether the project "informs the initial question." This project used self-efficacy as its theory of change.

Focusing on patient education, patient support, and giving patients a tool to help increase self-efficacy was the framework for the project. The initial question asked: will there be an increase in patient's perception of self-management of their diabetes with this project? Though the population was small, the majority of patients who utilized the logbook responded that "yes, this logbook helped with their diabetic management", along with the fact that there was a small increase in the Diabetic Self-Efficacy Scale, indicates that the patients had an increase in their self-perception of being able to manage their diabetes.

Section V: Discussion

Summary

Type 2 diabetes continues to be a growing problem not only in the U.S., but worldwide (CDC, 2015; WHO, 2015). Efforts to help with chronic disease management must include education and support of patients, education and training of clinicians, and system-wide changes in practice, in order for success in chronic disease management to occur (Corser & Yin, 2009). Additional factors that need to be addressed with patients include social support, health literacy, psychological illness, cultural and language barriers, as well as any other potential obstacles.

The design, planning, and implementation of this evidence-based change in practice project: introduction of a diabetes management workbook to the patients at the Golden Valley Health Centers clinic in Modesto, took a total of approximately six months. A gap was identified, a strategy was planned to fill the gap, research on the evidence was performed, and the project was structured to help patients to increase self-efficacy with regard to managing their diabetes.

The project was successful in the sense that there was an increase in the mean self-efficacy scores among the patients, as well as a decrease in the mean A1c. It is not known if this

is a statistically significant finding, but it is clinically significant since any increase in self-efficacy and decrease in A1c will hopefully decrease short and long-term complications of type 2 diabetes. This pilot project is only one part of the comprehensive plan that is needed for chronic disease management (See Appendix U).

Implications for Advanced Nursing Practice

Advanced practice nurses in primary care practice are at the forefront of chronic disease management. Nurse practitioners have proven successful at managing patients with chronic disease and are in a place where they can effect change (Gray & Romboli, 2013). Healthcare quality is a must, along with decreasing expenditures. Preventive care and chronic disease management are two areas in the current healthcare landscape that need more efficient processes, and nurse practitioners, along with other advanced practice nurses, will be able to direct the transformation in our current system.

This project has the ability to be disseminated to other FNPs and primary care providers. Sharing tools that are developed based on the current evidence will help to improve patient healthcare outcomes and ensure continuing success as clinicians.

Relation to Other Evidence

Although the number of project participants was small, the success in increasing self-efficacy and decreasing patient's A1cs was similar to other studies that utilized a culturally tailored diabetes self-management program. In this project the mean increase in self-efficacy score was an increase of +0.51, and the mean decrease in A1c was -0.56. A review by Minet, Moller, Vach, Wagner, and Henriksen (2010) showed that an intervention directed at self-care management in type 2 diabetes was associated with a greater reduction in A1c, than the control group (MD -0.36%, 95% CI -0.21 to -0.51). The interventions used in the studies were

behavioral/psychosocial and educational. One of the conclusions from this meta-analysis was that educational interventions were more effective.

Research performed by Sidorov, et al. (2002) retrospectively looked at health care claims and other measures of health care use among 6,799 patients enrolled in a Health Maintenance Organization (HMO). The study compared two groups: those who were enrolled in a disease management program (45.9%) and those who were not (54.1%). Program patients had a statistically significant lower monthly payment required from the insurance company, as well as lower inpatient admissions and emergency room visits. These statistics all remained significant, even after accounting for potential confounders. Additionally, only 6.7% of the disease management program participants had an A1c > 9.5%, compared to 14.4% of the patients not involved in the disease management program.

As seen, the literature supports diabetic self-management programs, to improve self-efficacy, lower health care costs, and improve overall health.

Barriers to Implementation

Barriers to implementation included logistics such as getting the diabetes guidebooks printed in both English and Spanish, determining which patients to include in the project, time constraints in the clinic, and time constraints for finishing the project. Additional obstacles were in follow-up with some of the patients. Certain patients did not show up for follow-up appointments, some patients cancelled their appointments, and some patients were unable to be reached, despite multiple phone calls. One patient was suffering from an acute psychosis and was not able to follow through. A few patients were averse to using a logbook and therefore did not participate.

An additional barrier encountered was my preceptor going on vacation at the end of my project, during follow-up with patients. This obstacle was overcome by scheduling the patients as a nursing visit in order to complete the survey. When this student met with patients, some wanted to discuss other medical problems or requested medication refills. An explanation had to be given to these patients that, as a student, this author could not provide what they needed and they were then referred to the physician taking care of the preceptor's patients in her absence.

Lessons Learned

In the future it would be helpful to realize when starting a project that everything will not always go as planned. Contingencies must be prepared for, and alternatives considered. One must be flexible and adaptable when transitioning from project idea to implementation in real life.

The difficulties encountered in the translation and the printing of the logbook meant it took more time and was more costly than originally planned for. Moving forward, if the clinic adopts this logbook, they may decide to make some changes. One change may be the ability to remove and add pages for the glucose log. Even though many pages were included, it became clear that patients would need additional pages if they were to continue using the book.

It took more time than anticipated to identify appropriate patients and to initiate this project. When planning the project, this student had the idea that diabetic patients could be found in the electronic health record. This data mining proved to be difficult, and therefore patients were identified on a rolling basis, as they were coming in to be seen for a scheduled diabetic appointment. As previously mentioned, the preceptor and her MAs made a concerted effort to schedule diabetics on Tuesdays, so that this student could enroll enough patients in the project. In the future, starting sooner to identify patients would be helpful in establishing the

number of people participating in the project, and give time for more patients to utilize the logbook and to have their lab work completed.

Interpretation

This evidence-based change in practice project met its objective of increasing patients' perception of diabetic self-management. These findings must be interpreted with caution, however, due to the small number of patients and difficulties with follow through. As a pilot project, however, lessons were learned which may help a larger implementation of the project to be successful. The majority of the patients who followed through felt that using the diabetic logbook helped them to better manage their disease. This is a starting point for chronic diabetes management, and further proposals to implement this project in the clinic could help build a comprehensive diabetes management program. Other components of a diabetes management program could include group diabetes classes, and having support processes in place including behavioral health counselors. Having algorithms in place for clinicians could ensure consistency among providers throughout the clinic. It remains to be seen whether the small effects seen with the project will be sustained over time.

Macro system implementation of this project would require a structured process to ensure ongoing education for the clinicians, as well as training any new providers. A class that is mandated yearly, but offers Continuing Medical Education Hours, would be one effective way to educate the healthcare providers. Additionally, the RNs and the MAs would have to be trained to continue with the operation of the disease management process. Yearly competencies could be created to fulfill this role.

A recent discussion took place between this DNP student and the Chief Medical Officer at GVHC, Dr. Ellen Piernot. Transformation is happening at the Golden Valley Clinics and they

are attempting to put processes in place to ensure consistency in chronic disease management, with diabetes being one of the diseases. They have initiated an educational program for patients with diabetes and Dr. Piernot stated that the logbook created in this project would dovetail nicely with the program. Therefore, it is a possibility that the logbook could be adopted clinic-wide.

Conclusions

Since there were a small number of patients who could be followed from start to finish in this pilot project, ultimate conclusions are uncertain. Continuing data collection on patients utilizing a tool such as the logbook will help the clinic at Golden Valley Health Centers to understand if it truly is a useful tool. Also, whether or not the gains made are sustained is a question that remains to be answered. Ongoing education with patients and clinicians is essential if this project is to be successfully implemented. Additionally, processes need to be put in place clinic-wide to ensure consistent management of diabetes, as well as other chronic diseases.

Cultural competence is becoming ever more relevant in our current health care environment. Tailoring programs to address chronic disease are imperative if we are to reach out to these populations on the fringe. As noted by Long et al. (2012), different ethnic populations may have different perceptions and different reactions to a diagnosis of diabetes. Healthcare providers must be sensitive to this fact to help those with chronic disease to be more healthful and to have an improved quality of life. Containing cost, another essential in our healthcare environment, while providing quality care, will help to keep our healthcare system on track and provide care without health disparities and inclusive of all populations.

Section VI: Other Information

Funding

This project was self-funded by the author and has not received, nor will receive, any outside funding from individuals, organizations, or commercial interests.

Section VII: References:

Agency for Healthcare Research and Quality (AHRQ), Accessed March 5, 2015. http://www.oshpd.ca.gov/HID/Products/PatDischargeData/AHRQ/pqi_overview.html

American Diabetes Association (2014). Standards of medical care in diabetes-2014. *Diabetes Care, 37*(1), S14-S80. doi: 10.2337/dc14-S014

Attridge, M., Creamer, J., Ramsden, M., Cannings-John, R., & Hawthorne, K. (2014). Culturally appropriate health education for people in ethnic groups with type 2 diabetes mellitus (Review). *The Cochrane Library, Issue 9,* Art. No. CD006424. doi: 10.1002/14651858.CD006424.pub3

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Boyle, J.P., Thompson, T.J., Gregg, E.W., Barker, L.E., & Williamson, D.F. (2010). Projection of the year 2050 burden of diabetes in the US adult population: Dynamic modeling of incidence, mortality, and prediabetes prevalence. *Population Health Metrics, 8*(29), 1-12. doi: 10.1186/1478-7954-8-29

California Health and Human Services, Accessed March 5, 2015 https://chhs.data.ca.gov/browse?q=diabetes&sortBy=relevance&utf8=%E2%9C%93

California Health and Human Services, Accessed July 12, 2015 http://www.chhs.ca.gov/Documents/HealthSummitObesityEpidemic2.pdf

Centers for Disease Control and Prevention (2015). National Diabetes Fact Sheet: General information and National Estimates on Diabetes in the United States. Retrieved January 3, 2015 from http://www.cdc.gov/diabetes/statistics/prev/national/figpersons.htm

Centers for Disease Control and Prevention (2015). Age-adjusted rate per 100 of civilian, noninstitutionalized population with diagnosed diabetes, hispanics, united states, 1997-2011. Retrieved January 5, 2015 from http://www.cdc.gov/diabetes/statistics/prev/national/figbyhispanic.htm

Centers for Disease Control and Prevention (2015). Overweight and obesity. Retrieved January 5, 2015 from http://www.cdc.gov/obesity/data/adult.html

Centers for Medicare and Medicaid Services (2015). Accessed March 2, 2015. http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Chronic-Conditions/index.html

Corser, W., & Yin, X. (2009). Facilitating patients' diabetes self-management: A primary care intervention framework. *Journal of Nursing Care Quality, 24*(2), 172-178.

Davidson, E.J. (2010). *Actionable evaluation basics: Getting succinct answers to the most important questions.* Auckland, New Zealand: Real Evaluation Ltd.

Diabetes Initiative, Robert Wood Johnson Foundation, accessed June 30, 2015. http://diabetesinitiative.org/

Eccles, M.P., Grimshaw, J.M., MacLennan, G., Bonetti, D., Glidewell, L., Pitts, N.B., …& Johnston, M. (2012). Explaining clinical behaviors using multiple theoretical models. *Implementation Science, 7*(99), 1-13. doi: 10.1186/1748-5908-7-99

Glazier, R.H., Bajcar, J., Kennie, N.R.,Willson, K. (2006). A systematic review of interventions to improve diabetes care in socially disadvantaged populations. *Diabetes Care, 29*(7), 1675-1688. doi: 10.2337/dc05-1942

Golden Valley Health Centers, http://www.gvhc.org/about/history-of-gvhc/, Accessed August 10, 2015.

Golden Valley Health Clinics, http://www.gvhc.org/about/mission-vision-values/ , Accessed March 5, 2015

Gray, K., & Romboli, J. (2013). Low-density lipoprotein cholesterol control rates in the type-2 diabetic patient population within independent nurse practitioner settings. *Journal of the American Association of Nurse Practitioners, 25*, 424-430. doi: 10.1111/j.1745-7599.2012.00805.x

Herman, W.H. (2013). The economic costs of diabetes: Is it time for a new treatment paradigm? *Diabetes Care, 36*, 775-776. doi: 10.2337/dc13-0270

Jang, Y. & Yoo, H. (2012). Self-management programs based on the social cognitive theory for Koreans with chronic disease: A systematic review. *Contemporary Nurse,40*(2), 147-159.

Johns Hopkins Nursing Evidence-Based Practice Appraisal Tool, Accessed February 8, 2015. www.nursingworld.org/documentvault/nursingpractice/research-toolkit/jhnebp-research-evidence-appraisal.pdf

King, D.K., Glasgow, R.E., Toobert, D.J., Stryker, L.A., Estabrooks, P.A., Osuno, D., & Faber, A.J. (2010). Self-efficacy, problem solving, social-environmental support are associated with diabetes self-management behaviors. *Diabetes Care, 33*(4), 751-753.

Long, J.M., Sowell, R., Bairan, A., Holtz, C., Curtis, A.B., & Fogarty, K.J. (2012). Exploration of commonalities and variations in health related beliefs across four latino subgroups using focus group methodology: Implications in care for latinos with type 2 diabetes. *Journal of Cultural Diversity, 19*(4), 133-142.

Lorig, K.R., Ritter, P.L., & Gonzalez,V.M. (2004). Hispanic chronic disease self-management: a randomized community-based outcome trial. *Nursing Research, 52*(6), 361-9.

Lorig, K.R., Ritter, P.L., Villa, F.J., & Armas, J. (2009). Community-based peer-led diabetes self-management: A randomized trial. *The Diabetes Educator, 35*(4), 641-51.

Minet L, Moller S, Vach W, Wagner L, & Henriksen JE. (2010). Mediating the effect of self-care management intervention in type 2 diabetes: a meta-analysis of 47 randomised controlled trials. *Patient Education and Counseling*, *80*(1): 29-41. doi: 10.1016/j.pec.2009.09.033

Nam, S., Janson, S.L., Stotts, N.A., Chesla, C., & Kroon, L. (2012). Effect of culturally tailored diabetes education in ethnic minorities with type 2 diabetes: A meta-analysis. *Journal of Cardiovascular Nursing,27*(6), 505-518. doi: 10.1097/ JCN.0b013e31822375a5

Ricci-Cabello, I., Ruiz-Pérez, I., Rojas-García, A., Pastor, G., Rodríguez-Barranco, M., & Gonçalves, D.C. (2014). Characteristics and effectiveness of diabetes self-management educational programs targeted to racial/ethnic minority groups: A systematic review, meta-analysis and meta-regression. *BMC Endocrine Disorders, 14*(60), 1-13. doi: 10.1186/1472-6823-14-60

Rowley, W.R., & Bezold, C. (2012). Creating public awareness: State 2025 diabetes forecasts. *Population Health Management, 15*(4), 194-200. doi: 10.1089/pop.2011.0053

Sarwar, N., Gao, P., Kondapally Seshasai, S.R., Gobin, R., Kaptoge, S., Di Angelantonio, E., …& Danesh, J. (2010). Diabetes mellitus, fasting blood glucose concentration, and risk of vascular disease: A collaborative meta-analysis of 102 prospective studies. *The Lancet, 375*, 2215-2222

Sidorov, J., Shull, R., Tomcavage, J., Girolami, S., Lawton, N., & Harris,R. (2002). Does diabetes disease management save money and improve outcomes? A report of simultaneous short-term savings and quality improvement associated with a health

maintenance organization-sponsored disease management program among patients fulfilling health employer data and information set criteria. *Diabetes Care, 25*(4), 684-689.

Smedley, B.D., Stith, A.Y., & Nelson, A.R. (Eds.). (2003). Unequal treatment: Confronting racial and ethnic disparities in health care. National Academies Press. Retrieved January 10, 2015 from http://www.nap.edu/catalog/10260.html

Stanford Patient Education Research Center, Accessed January 21, 2015. http://patienteducation.stanford.edu

Stanislaus County Health Services Agency, Accessed March 5, 2015 http://www.schsa.org/PublicHealth/pdf/dataPublications/demographics.pdf

Stanislaus County Health Services Agency, Accessed March 5, 2015 http://www.schsa.org/PublicHealth/pdf/dataPublications/diabetes.pdf

Stanislaus County Health Services Agency, Accessed March 5, 2015 http://www.schsa.org/PublicHealth/pdf/dataPublications/obesity-data.pdf

Stanislaus County Health Services Agency, Accessed on March 5, 2015. http://www.schsa.org/PublicHealth/pdf/dataPublications/communityHealthAssessment/2013-Stanislaus-County-Community-Health-Assessment.pdf

Turner, R.C., Holman, R.R., Cull, C.A., Stratton, I.M., Matthews, D.R., Frighi, V., …& Hadden, D. (1998). Intensive blood-glucose control with sulphonyureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *The Lancet, 352*, 837-853

University of San Francisco. (https://usfca.instructure.com/courses/1104360/pages/irbphs). Accessed March 12, 2015.

U.S. Census Bureau. http://quickfacts.census.gov/qfd/states/06/0648354.html. Accessed August 10, 2015.

U.S. Department of Health and Human Services (2015). Online IRB Training. Accessed March 11, 2015. http://ohrp-ed.od.nih.gov/CBTs/Assurance/login.asp

U.S. Department of Health and Human Services (2015). Quality Improvement. Accessed February 20, 2015. http://www.hrsa.gov/quality/toolbox/methodology/qualityimprovement/

U.S. Department of Health and Human Services (2015). The affordable care act. Accessed January 15, 2015 from http://www.hhs.gov/healthcare/rights/law/index.html

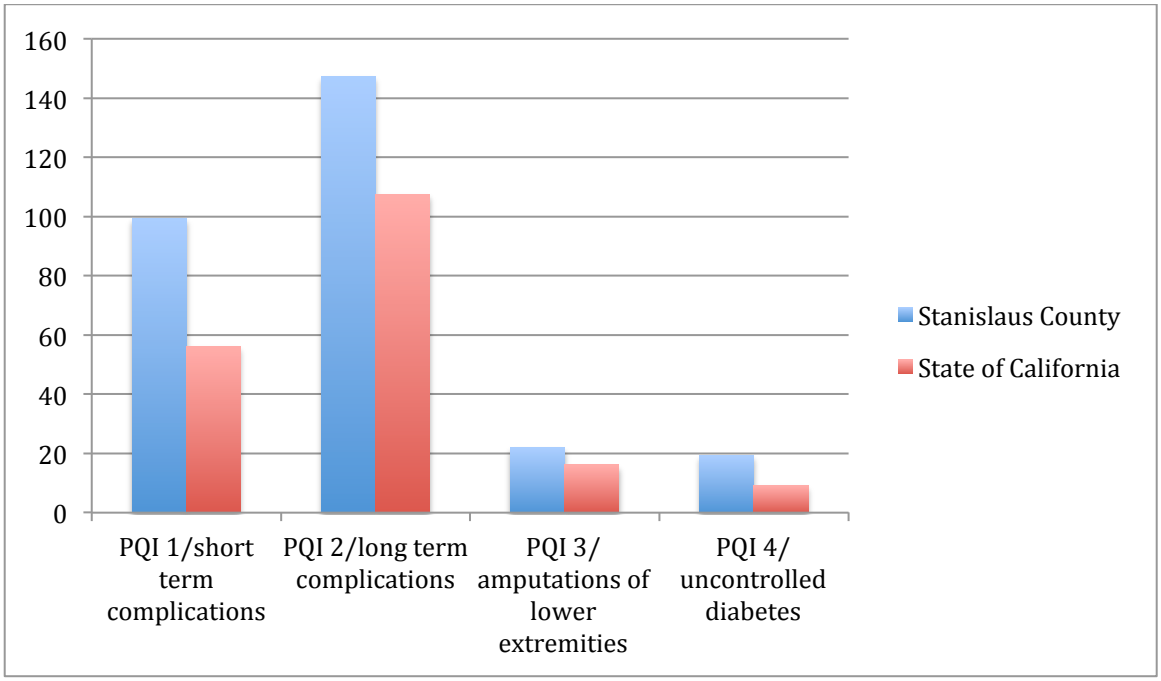
Walker, R.J., Smalls, B.L., Hernandez-Tejada, M.A., Campbell, J.A., & Egede, L.E. (2014). Effect of diabetes self-efficacy on glycemic control, medication adherence, self-care behaviors, and quality of life in a predominantly low-income, minority population. *Ethnicity & Disease, 24*(3), 349-355

World Health Organization (2015). Diabetes fact sheet, updated January 2015. Retrieved January 20, 2015 from http://www.who.int/topics/diabetes_mellitus/en/

Zhong, Y, Lin, P-J, Cohen, J.T., Winn, A.N., & Neumann, P.J. (2015). Cost-utility analyses in diabetes: A systematic review and implications from real-world evidence. *Value in Health, 18,* 308-314.

Section VIII: Appendices

Appendix A: Comparison of number of cases/100,000 population for Stanislaus Co. and the State of California



Appendix B: JHNEBP Research Evidence Appraisal Sample Sheet

The Johns Hopkins University

ARTICLE TITLE: NUMBER:
AUTHOR(S): DATE:
JOURNAL:
SETTING: SAMPLE (COMPOSITION/SIZE)
-Experimental - Meta analysis
- Quasiexperimental
- Nonexperimental
- Qualitative - Metasynthesis
Does this study apply to my patient population? -Yes - No

Strength of Study Design
• Was sample size adequate and appropriate?
• Were study participants randomized?
• Was there an intervention?
• Was there a control group?
• If there was more than one group, were groups equally treated, except for the intervention?
• Was there adequate description of the data collection methods

Study Results
• Were results clearly presented?
• Was an interpretation/analysis provided?

Study Conclusions
• Were conclusions based on clearly presented results?
• Were study limitations identified and discussed?

STRENGTH OF EVIDENCE
LEVEL 1 (HIGHEST):
EXPERIMENTAL STUDY (RANDOMIZED CONTROLLED TRIAL OR RCT)
• Study participants (subjects) are randomly assigned to either a treatment (TX) or control (non-treatment) group.
• May be:
-Blind: neither subject nor investigator knows which TX subject is receiving.
-Double-blind: neither subject nor investigator knows which TX subject is receiving.
-Non-blind: both subject and investigator know which TX subject is receiving; used when it is felt that the knowledge of treatment is unimportant.
META-ANALYSIS OF RCTS
• Quantitatively synthesizes and analyzes results of multiple primary studies addressing a similar research question

• Statistically pools results from independent but combinable studies
• Summary statistic (effect size) is expressed in terms of direction (positive, negative, or zero) and magnitude (high, medium, small)

LEVEL 2

QUASI-EXPERIMENTAL STUDY

• Always includes manipulation of an independent variable
• Lacks either random assignment or control group.
• Findings must be considered in light of threats to validity (particularly selection)

LEVEL 3

NON-EXPERIMENTAL STUDY

• No manipulation of the independent variable.
• Can be descriptive, comparative, or relational.
• Often uses secondary data.
• Findings must be considered in light of threats to validity (particularly selection, lack of severity or co-morbidity adjustment).

QUALITATIVE STUDY

- Explorative in nature, such as interviews, observations, or focus groups.
- Starting point for studies of questions for which little research currently exists.
- Sample sizes are usually small and study results are used to design stronger studies that are more objective and quantifiable.

META-SYNTHESIS

- Research technique that critically analyzes and synthesizes findings from qualitative research
- Identifies key concepts and metaphors and determines their relationships to each other
- Aim is not to produce a summary statistic, but rather to interpret and translate findings

QUALITY RATING (SCIENTIFIC EVIDENCE)

A: High quality: consistent results, sufficient sample size, adequate control, and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific evidence.

B: Good quality: reasonably consistent results, sufficient sample size, some control, and fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence

C: Low quality or major flaws: little evidence with inconsistent results, insufficient sample size, conclusions cannot be drawn.

Appendix C: IRB certificates

Human Subject Assurance Training

Exit

Return to Table of Contents

This certifies that Margo Sutton has completed the Human Subject Assurance online training, Module 1.

Wednesday, March 11, 2015

(Use your browser's "Print" button to print this certificate.)

Human Subject Assurance Training

Exit

Return to Table of Contents

This certifies that Margo Sutton has completed the Human Subject Assurance online training, Module 2.

Wednesday, March 11, 2015

(Use your browser's "Print" button to print this certificate.)

Human Subject Assurance Training

Exit

Return to Table of Contents

This certifies that Margo Sutton has completed the Human Subject Assurance online training, Module 3.

Wednesday, March 11, 2015

(Use your browser's "Print" button to print this certificate.)

Appendix D: Diabetic Logbook (English Version)

MY DIABETES LOGBOOK

NAME_____

****Be sure to bring this logbook to every appointment with your healthcare provider*

Personal Information:

Name_____

Address_____

_____

Phone #_____

Doctor_____

American Diabetes Association (ADA) recommended target for blood glucose:
Before eating: 70-130 mg/dL
1-2 hours after eating: < 180 mg/dL

**If your blood sugar is consistently high (over 250 mg/dL) or low (less than 70 mg/dL), contact your healthcare provider. Your medications may need to be adjusted

- This logbook will help you to keep track of your blood sugars, your lab results, your annual diabetic exams, the medications you are taking, and your doctor appointments.
- Keeping your diabetes under control will help you to feel better, have more energy, and improve your overall well-being.
- This logbook will help you to take control of your diabetes and live a healthier life!!

Symptoms of Low Blood Sugar (Hypoglycemia):	If blood sugar is too low (< 70 mg/dL and/or you are having symptoms of low blood sugar), take one of the following:
~Feeling Shaky ~Feeling Hungry ~Having Palpitations (feels like your heart is racing) ~Feeling Sweaty ~Having Anxiety ~Feeling Nauseated ** If you are experiencing any of these symptoms: check your blood sugar and if low then do one of these	~Take 15 grams of glucose tablets (if you have them – they can be purchased in any drugstore) ~Drink 3 packets of sugar dissolved in water ~Drink ¾ cup of juice or regular soft drink ~Eat 6 lifesavers, or other hard candy with sugar ~Take 1 tablespoon of honey **Always recheck your blood sugar to make sure it is coming up!

A List of All My Medications

1.
2.
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5.
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12.

My Appointments:

Date/Reason:_____

Date/Reason:_____

Date/Reason:_____

Date/Reason:_____

Date/Reason:_____

Date/Reason:_____

Date/Reason:_____

Date/Reason:_____

Date/Reason:_____

Date/Reason:_____

Important Diabetic Tests To Know:

The A1c:

The A1c is a very important number in your diabetes. The higher the A1c, the greater your risk for diabetic problems (kidney disease, eye disease, heart attacks and strokes). Generally, your A1c should be less than 7%. This is a number to aim for to reduce diabetic problems. The A1c is a blood test done every 3 months. It is important for you to know this number and to keep track of it in this logbook.

Lipids (A test is done to check for the fat levels in your blood):

Too much of certain fats in the blood can cause heart attacks, strokes and pancreatitis (inflammation of the pancreas – this can happen if your triglyceride levels are very high).

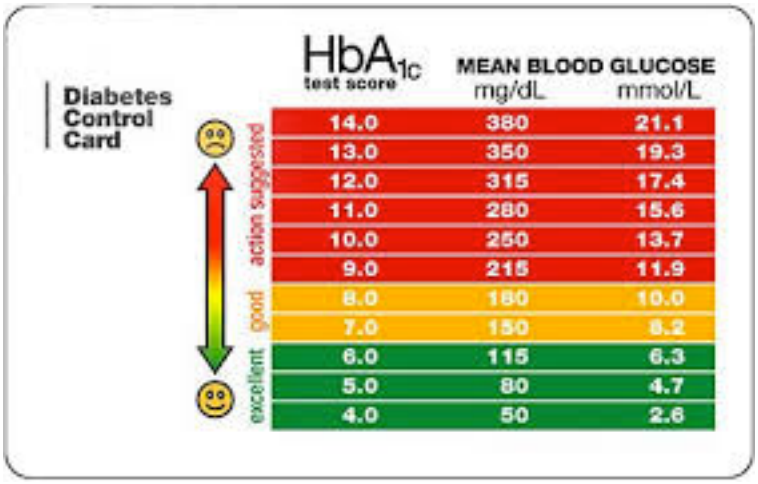
LDL: Should be LESS than 100 mg/dL

HDL: Should be OVER 50 mg/dL

Triglycerides: Should be LESS than 150 mg/dL

-This logbook will help you to keep track of these numbers. Your doctor may check these every 3 months, or if your lipids are good, they may be checked every year.

*Source ADA



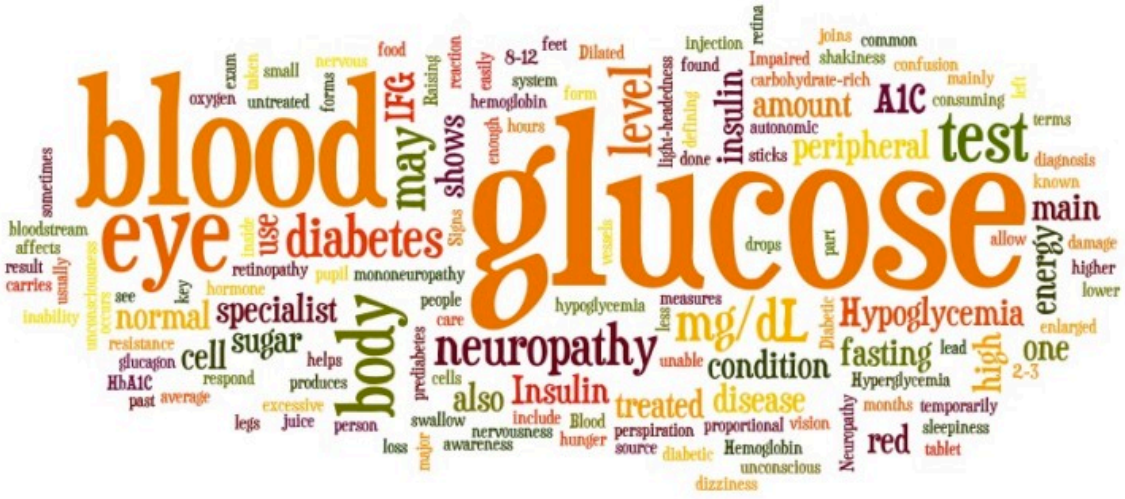
Tests You Need to Get Every Year:

Eye Exam: important to check for damage to your eyes from your diabetes. If caught early, some treatments may help prevent further damage. Your eyes are very important – take good care of them!

Foot Exam: important to get checked by a podiatrist (foot doctor) to examine the feet for any damage to the nerves from diabetes.

Urine Test: yearly test which checks for protein in the urine, which can mean there is some damage to your kidneys. If found early, may prevent further kidney problems.

It is important to control your diabetes to help stop damage to your eyes, nerves and kidneys



Should Check at Every Doctor Visit:

-Weight

-Blood Pressure (Should be less than 140/80 – source: ADA)

AND….
-You should check your blood sugar at least twice a day (before breakfast and before dinner) and at any time you feel it may be low.

-You should examine your feet EVERY day for any cuts, sores or other problems. Wear good shoes: shoes that fit comfortably, and do not create pressure on your feet.

Health Checklist:
Target A1c < 7%, Target LDL < 100 mg/dL, Target HDL > 50 mg/dL, Target Triglycerides < 150 mg/dL, Target Blood Pressure < 140/80 mmHg

Record Your Numbers Below:

Date/A1c	Date/LDL	Date/HDL	Date/TRI	Date/BP

Health Checklist:
Dilated Eye Exam, Foot Exam, Urine Test

Record Your Dates Below:

Date/Eye Exam	Date/Foot Exam	Date/Urine Test

My Glucose Log: (Actual book contains multiple pages for glucose recording)

Date	AM/Result	Midday/Result	PM/Result	Time/Result

REMEMBER: You can take control of your diabetes and your life!!

My Notes/My Questions:

Appendix E: Diabetic Logbook (Spanish Version)

Mi Libro de Registro de Diabetes

Nombre:_____

****Asegúrese de llevar este libro de registro a cada cita con su proveedor de atención médica***

Información Personal:

Nombre_____

Dirección_____

_____

Número de teléfono_____

Médico_____

Asociación Americana de La Diabetes (ADA) objetivo recomendado para la glucosa en sangre:
Antes de comer: 70-130 mg/dL
1-2 horas después de comer: < 180 mg/dL

**Si su azúcar en la sangre es siempre alta (mas de 250 mg/dL) o baja (menos de 70 mg/dL), contacte a su médico para recibir atención médica.

- Este libro de registro le ayudará a mantener un seguimiento de los niveles de azúcar en la sangre, los resultados de laboratorio, los examines anuales diabéticos, los medicamentos que usted está tomando, y las citas con el médico.
- Mantener su diabetes bajo control le ayudará a sentirse mejor, tener más energía, y mejorar su bienestar general.
- ¡Este libro de registro le aydará a tomar el control de su diabetes y vivir una vida más sana!

Síntomas de bajo nivel de azúcar (Hipoglucemia):	Si el azúcar en la sangre es demasiado bajo (< 70 mg/dL y/o tiene síntomas de bajo nivel de azúcar en la sangre), tome **UNO** de los siguientes:
~Sentirse inestable o mareado ~Tener hambre ~Tener palpitaciones (se siente que su corazón se acelera) ~Sentirse sudoroso/a ~Tener ansiedad ~Sentir náuseas ** Si usted está experimentando cualquiera de estos síntomas: Revise su azúcar en la sangre y si está baja, entonces siga **UNO** de estas indicaciones.	~Tomar 15 gramos de tabletas de glucosa (si las tiene – puede comprar las tabletas en cualquier farmacia) ~Beber 3 paquetes de azúcar disuelto en agua ~Beber ¾ taza de jugo o refresco normal ~Comer 6 salvavidas u otro dulce o caramelo duro ~Tomar 1 cucharada de miel **Despues de ½ hora revise el nivel de azúcar en la sangre para asegurarse de que está subiendo

Mis Medicamentos

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12.

Mis Citas:

Fecha/Razón:_____

Fecha/Razón:_____

Fecha/Razón:_____

Fecha/Razón:_____

Fecha/Razón:_____

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Fecha/Razón:_____

Fecha/Razón:_____

Fecha/Razón:_____

Fecha/Razón:_____

Pruebas de diabetes importantes de tener en cuenta:

El A1c:

El A1c es un número muy importante de su diabetes. Entre más alto el número de A1c, mayor el riesgo para complicaciones diabéticas (enfermedad renal, ocular, y cardiovascular). Idealmente, su A1c debe ser menos que 7%. El A1c es un análisis de sangre cada 3 meses, mantenerlo bajo control ayuda a reducir las complicaciones diabéticas. Es importante conocer este número y hacer un seguimiento de el en este libro.

Lípidos (Una prueba para comprobar el nivel de grasa en la sangre):

Lípidos abnormales pueden causar ataques cardíacos, accidentes cerebrovasculares, y pancreatitis (una inflamación del pancreas).

LDL: Debe ser menos de 100 mg/dL

HDL: Debe ser más de 50 mg/dL

Triglycerides: Debe ser menos de 150 mg/dL

-Es importante conocer los numerous de lípidos y hacer un seguimiento de ellos en este libro. Su médico puede revisarlos cada 3 meses, o si son normales, cada año.

*Fuente ADA

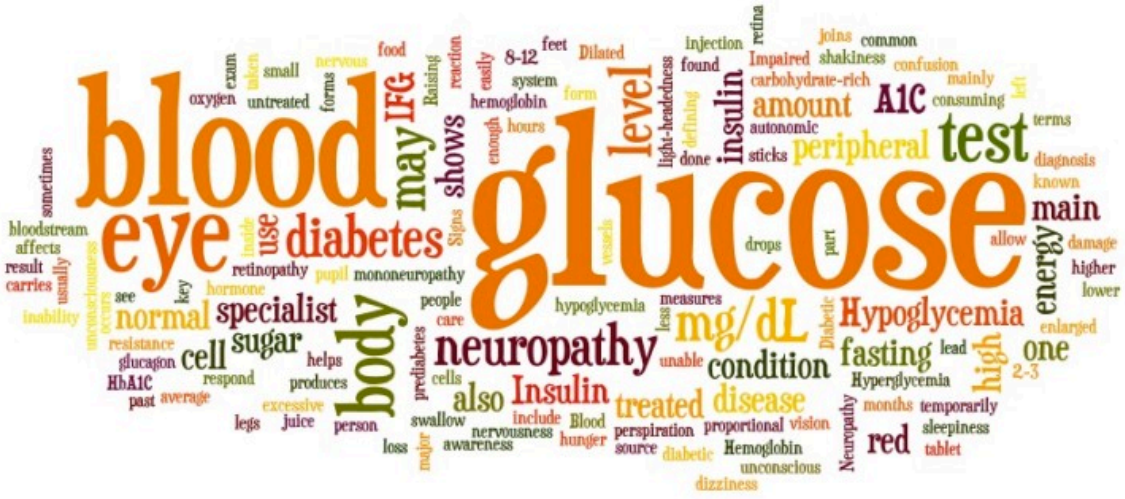
Pruebas de diabetes importantes para obtener cada año:

Examen de los ojos con dilatación: Es importante para verificar daños a los ojos causados por la diabetes. Si se detecta a tiempo, algunos tratamientos pueden ayudar a prevenir más daños. Sus ojos son muy importantes – ¡Cuidalos!

Examen completo de los pies: Es importante para consultar un podólogo (médico de los pies) para examiner los pies para revisar y prevenir cualquier daño a los nervios de los pies causados por la diabetes.

Análisis de orina: Prueba anual de proteinas en la orina, que significa que hay algun daño en sus riñones. Si se detecta a tiempo, algunos tratamientos pueden ayudar a prevenir mas daño.

Es importante controlar su diabetes para ayudar a detener el daño a los ojos, los nervios, y los riñones



Revisar en cada visita a su médico:

-Peso

-Presión arterial (Debe ser menor de 140/80 – fuente: ADA)

Y….
-Usted debe revisar su nivel de azúcar en la sangre al menos dos veces por día (antes de desayuno y antes de la cena) y en cualquier momento que sienta que puede ser baja.

-Usted debe examinar sus pies todos los días por si hay cortaduras, úlceras, u otros problemas. Usar zapatos adecuados: zapatos que se ajusten cómodamente y no crean presión en cualquier punto.

Lista de control de la salud:
Objetivo A1c < 7%, Objetivo LDL < 100 mg/dL, Objetivo HDL > 50 mg/dL, Triglicerados objetivo < 150 mg/dL, Objetivo de presión arterial < 140/80 mmHg

Registrar sus valores por debajo:

Fecha/A1c	Fecha/LDL	Fecha/HDL	Fecha/TRI	Fecha/BP

Lista de control de la salud:
Examen de los ojos, examen de los pies, análisis de orina

Anote las fechas de revisiones:

Fecha/Examen de los ojos	Fecha/Examen de los pies	Fecha/Análisis de orina

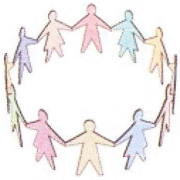
Diario de nivel de azúcar: (Multiple pages in actual book)

Fecha	AM/Resultado	Medio Día/Resultado	PM/Resultado	Otro nivel (al azar)/Hora o tiempo/Resultado

RECUERDE: ¡Usted puede tomar el control de su diabetes y su vida!

Mis Notas/Mis Preguntas:

Appendix F: Diabetes Self-Efficacy Scale (English Version)



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PATIENT EDUCATION
RESEARCH CENTER

Self-Efficacy for Diabetes

We would like to know how confident you are in doing certain activities. For each of the following questions, please choose the number that corresponds to your confidence that you can do the tasks regularly at the present time.

1. How confident do you feel that you can eat your meals every 4 to 5 hours every day, including breakfast every day?

2. How confident do you feel that you can follow your diet when you have to prepare or share food with other people who do not have diabetes?

3. How confident do you feel that you can choose the appropriate foods to eat when you are hungry (for example, snacks)?

4. How confident do you feel that you can exercise 15 to 30 minutes, 4 to 5 times a week?

5. How confident do you feel that you can do something to prevent your blood sugar level from dropping when you exercise?

6. How confident do you feel that you know what to do when your blood sugar level goes higher or lower than it should be?

7. How confident do you feel that you can judge when the changes in your illness mean you should visit the doctor?

8. How confident do you feel that you can control your diabetes so that it does not interfere with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

Scoring

The score for each item is the number circled. If two consecutive numbers are circled, code the lower number (less self-efficacy). If the numbers are not consecutive, do not score the item. The score for the scale is the mean of the six items. If more than two items are missing, do not score the scale. Higher number indicates higher self-efficacy.

Characteristics

Tested on 186 subjects with diabetes.

No. of items	Observed Range	Mean	Standard Deviation	Internal Consistency Reliability	Test-Retest Reliability
8	1-10	6.87	1.76	.828	NA

Source of Psychometric Data

Stanford English Diabetes Self-Management study. Study reported in Lorig K, Ritter PL, Villa FJ, Armas J. Community-Based Peer-Led Diabetes Self-Management: A Randomized Trial. The Diabetes Educator 2009; Jul-Aug;35(4):641-51.

Comments

This 8-item scale was originally developed and tested in Spanish for the Diabetes Self-Management study. For internet studies, we add radio buttons below each number. There is another way that we use to format these items, which takes up less space on a questionnaire, shown also in the PDF document. This scale is available in Spanish.

References

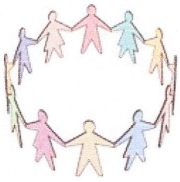
Unpublished.

This scale is free to use without permission

Stanford Patient Education Research Center
1000 Welch Road, Suite 204
Palo Alto CA 94304
(650) 723-7935
(650) 725-9422 Fax
self-management@stanford.edu
http://patienteducation.stanford.edu

Funded by the National Institute of Nursing Research (NINR)

Appendix G: Diabetes Self-Efficacy Scale (Spanish Version)



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Spanish Diabetes Self-Efficacy

En las siguientes preguntas nos gustaría saber qué piensa Ud. de sus habilidades para controlar su enfermedad. Por favor marque el número que mejor corresponda a su nivel de seguridad de que puede realizar en este momento las siguientes tareas.

1. ¿Qué tan seguro(a) se siente Ud. de poder comer sus alimentos cada 4 ó 5 horas todos los días. Esto incluye tomar desayuno todos los días?

muy inseguro(a) 1 2 3 4 5 6 7 8 9 10 muy seguro(a)

2. ¿Que´ tan seguro(a) se siente Ud. de continuar su dieta cuando tiene que preparar o compartir alimentos con personas que no tienen diabetes?

muy inseguro(a) 1 2 3 4 5 6 7 8 9 10 muy seguro(a)

3. ¿Qué tan seguro(a) se siente Ud. de poder escoger los alimentos apropiados para comer cuando tiene hambre (por ejemplo, bocadillos)?

muy inseguro(a) 1 2 3 4 5 6 7 8 9 10 muy seguro(a)

4. ¿Qué tan seguro(a) se siente Ud. de poder hacer ejercicios de 15 a 30 minutos, unas 4 o 5 veces por semana?

muy inseguro(a) 1 2 3 4 5 6 7 8 9 10 muy seguro(a)

5. ¿Qué tan seguro(a) se siente Ud. de poder hacer algo para prevenir que su nivel de azúcar en la sangre disminuya cuando hace ejercicios?

muy inseguro(a) 1 2 3 4 5 6 7 8 9 10 muy seguro(a)

6. ¿Qué tan seguro(a) se siente Ud. de poder saber qué hacer cuando su nivel de azúcar en la sangre sube o baja más de lo normal para usted?

muy inseguro(a) 1 2 3 4 5 6 7 8 9 10 muy seguro(a)

7. ¿Qué tan seguro(a) se siente Ud. de poder evaluar cuando los cambios en su enfermedad significan que usted debe visitar a su médico?

muy inseguro(a) 1 2 3 4 5 6 7 8 9 10 muy seguro(a)

1

8. ¿Qué tan seguro(a) se siente Ud. de poder controlar su diabetes para que no interfiera con las cosas que quiere hacer?

muy inseguro(a)	1	2	3	4	5	6	7	8	9	10 muy seguro(a)

Scoring

The score for each item is the number circled. If two consecutive numbers are circled, code the lower number (less self-efficacy). If the numbers are not consecutive, do not score the item. The score for the scale is the mean of the eight items. If more than two items are missing, do not score the scale. Higher number indicates higher self-efficacy.

Characteristics

Tested on 189 Spanish-speaking subjects with type 2 diabetes.

No. of items	Observed Range	Mean	Standard Deviation	Internal Consistency Reliability	Test-Retest Reliability
8	1.13-10	6.46	2.07	.854	NA

Source of Psychometric Data

Spanish Diabetes Self-Management (Programa de Manejo Personal de la Diabetes) Study. Study reported in Lorig KR, Ritter PL, Gonzalez VM. Hispanic chronic disease self-management: a randomized community-based outcome trial. Nurs Res. 2003; Nov-Dec;52(6):361-9.

Comments

This 8-item scale was developed and tested in Spanish for the Diabetes Self-Management study, and has been translated into English. There are 2 ways to format these items. We use the format above, because it takes up less room on the questionnaire. The other is shown on the web page.

References

Unpublished at this time.

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Stanford Patient Education Research Center
1000 Welch Road, Suite 204
Palo Alto CA 94304
(650) 723-7935
(650) 725-9422 Fax
self-management@stanford.edu
http://patienteducation.stanford.edu

Funded by the National Institute of Nursing Research (NINR)

Appendix H: Pre-Project Questionnaire (English/Spanish)

1. Do you currently check your blood sugar every day? (Yes or no).

2. Do you currently write down your blood sugar numbers? (Yes or no)

3. How comfortable do you feel using a daily logbook for your diabetes? (Circle a number on the chart below).

1 (very uncomfortable)---2---3---4---5---6---7---8---9---10 (very comfortable)

---

1. Comprueba su azúcar en la sangre todos los días? (Si o no).

2. Registra sus números de azúcar en la sangre todos los días? (Si o no).

3. Cómo hacen siente sobre usando un libro de registro para su diabetes todos los días? (Marque un número en la tabla de abajo)

   1 (muy incómodo)---2---3---4---5---6---7---8---9---10 (muy cómodo)

Appendix I: Post-Project Questionnaire (English/Spanish)

1. Do you feel that using this logbook has helped you with managing your diabetes? (Yes or No).

2. How easy was it for you to use this logbook? (Circle answer on the scale below)

   (Very easy) 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 (Very difficult)

   Any comments or concerns you would like to share?

---

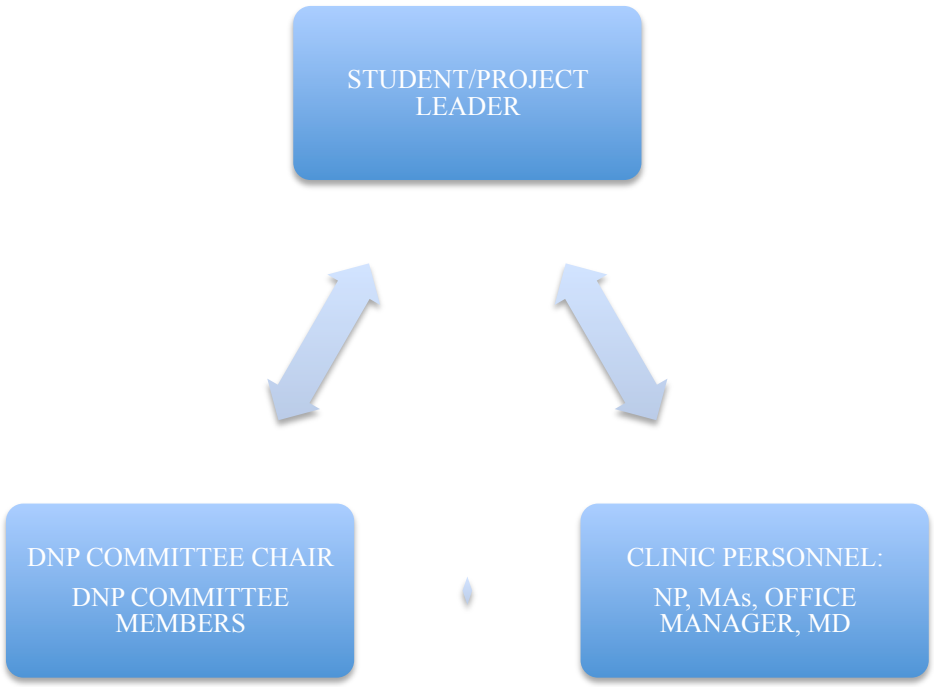
1. ¿Crees que utilizando este libro de registro ha ayudado con el manejo de su diabetes? (Sí o no)

2. ¿Qué fácil fue para poder utilizar este libro? (Respuesta del círculo abajo)

   (Muy fácil) 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 (Muy difícil)

   ¿Algún comentario o preocupaciones?

Appendix J: Responsibility/Communication Matrix



Appendix K: GANNT CHART OF PROJECT TIMELINE

Research & Design Logbook							
Print Logbooks/English & Spanish							
Identify Patients for Pilot Project							
Pre-Project Survey for Patients							
Introduce Logbook to Patients							
2-3 month follow-up with patients							
Post-Project Survey for Patients							
Collect Data							
Final Project Write-up							
	February 2015	March 2015	April 2015	May 2015	June 2015	July 2015	August 2015

Appendix L: SWOT analysis

SWOT Analysis		
	Strengths	Weaknesses
Internal	• Support of the staff (FNP, MDs, MAs) • Low cost and ease of implementation • Patients who were receptive to using the logbook • Evidence from the literature supporting use of a logbook	• Patients who were not receptive to using the logbook • Difficulty with follow-up with some patients • Patients who received the logbook who did not read or utilize the book
	Opportunities	Threats
External	• Opportunity for patients to learn self-management of their diabetes, and possibly decrease their A1c • Chance for GVHC to use the diabetic logbook clinic wide and possibly evolve the book into a management tool for other chronic diseases	• Potential funding problems • Difficulties with translating and printing logbooks • Potential lack of provider or patient support • Preceptor being inaccessible for 3 weeks • Shorter time frame for project than originally anticipated

Appendix M: Cost/Benefit Analysis

ITEM	COST
Project Cost (Printing logbooks)	$400.00
Provider Hours	Volunteered by DNP student & MAs

ITEM	COST
Project Benefits	Unknown
Decreased medical costs	(Potentially) Approximately $43,900 per person per year

Nonquantifiable Benefits:

- Increased health for Patients
- Better chronic disease management
- Consistency among providers
- Improved medical care

Appendix N: Budget

ITEM	MATERIAL COST	STAFF COST
Printing of Logbooks	$400.00	----------
Provider Hours	----------	Volunteered
Total Project Cost	$400.00	----------

Appendix O: Self-Efficacy for Diabetes Scores (Pre- and Post-Intervention)

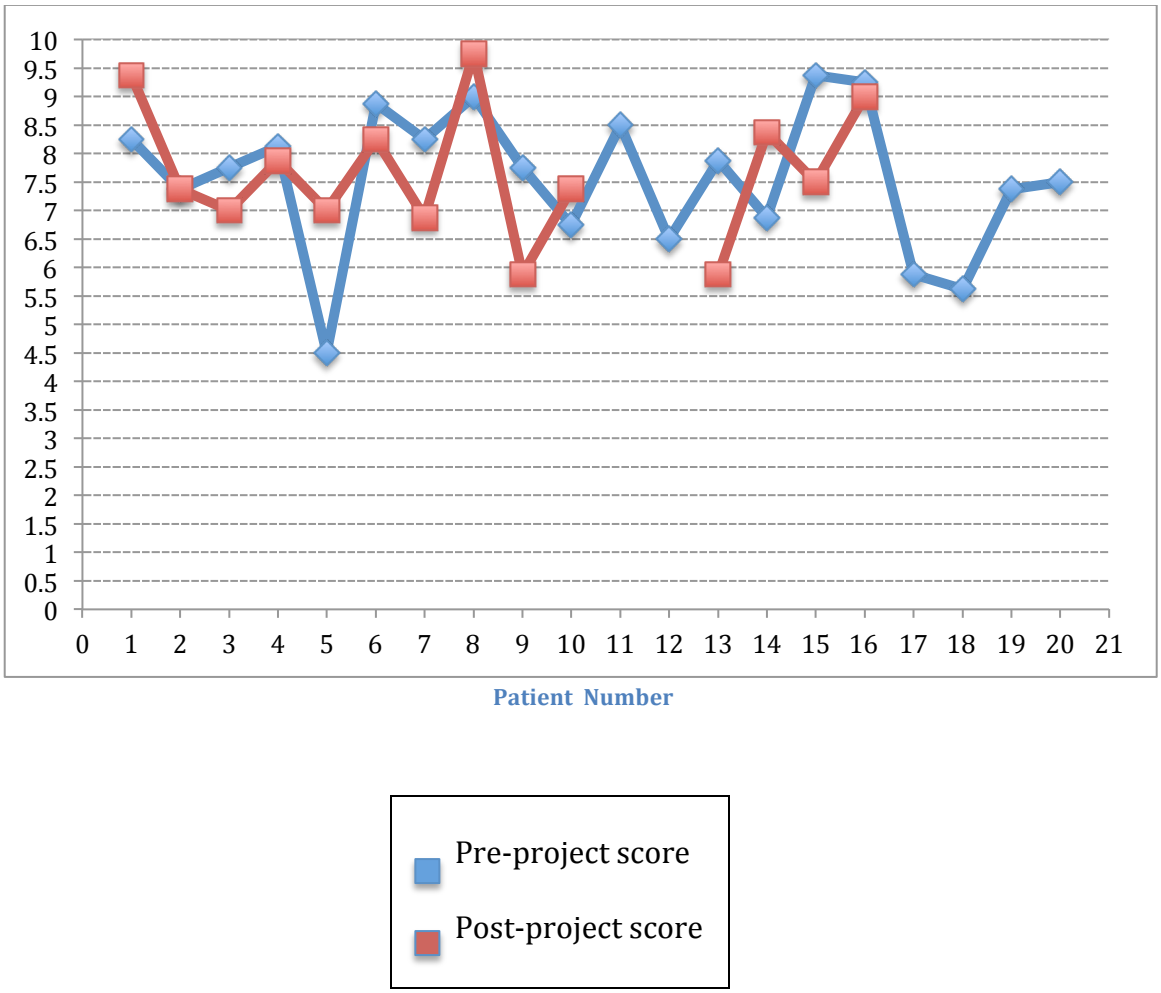
Patient	Self-Efficacy Pre-	Self-Efficacy Post-	Change
1	8.25	9.375	+1.125
2	7.375	7.375	0
3	7.75	7	-0.75
4	8.125	7.875	-0.25
5	4.5	7	+2.5
6	8.875	8.25	-0.625
7	8.25	6.875*	-1.375
8	9	9.75	+0.75
9	7.75	5.875*	-1.875
10	6.75	7.375	+0.625
11	8.5	**	**
12	6.5	**	**
13	7.875	5.875*	-2.0
14	6.875	8.375	+1.5
15	9.375	7.5	-1.875
16	9.25	9	-0.25
17	5.875	**	**
18	5.625	**	**
19	7.375	**	**
20	7.5	**	**

(+ change = more self-efficacy, - change = less self-efficacy)
*Did not use logbook
**Unable to follow-up

	Mean Score	Median Score	Range of Scores
Pre-Project	7.57	7.75	4.5-9.375
Post-Project	8.08	7.875	7-9.75
Change	+0.51	+0.125	_____

Appendix P: Diabetes Management Self-Efficacy Scores

Figure 1



Appendix Q: HbA1c Pre- and Post-Intervention

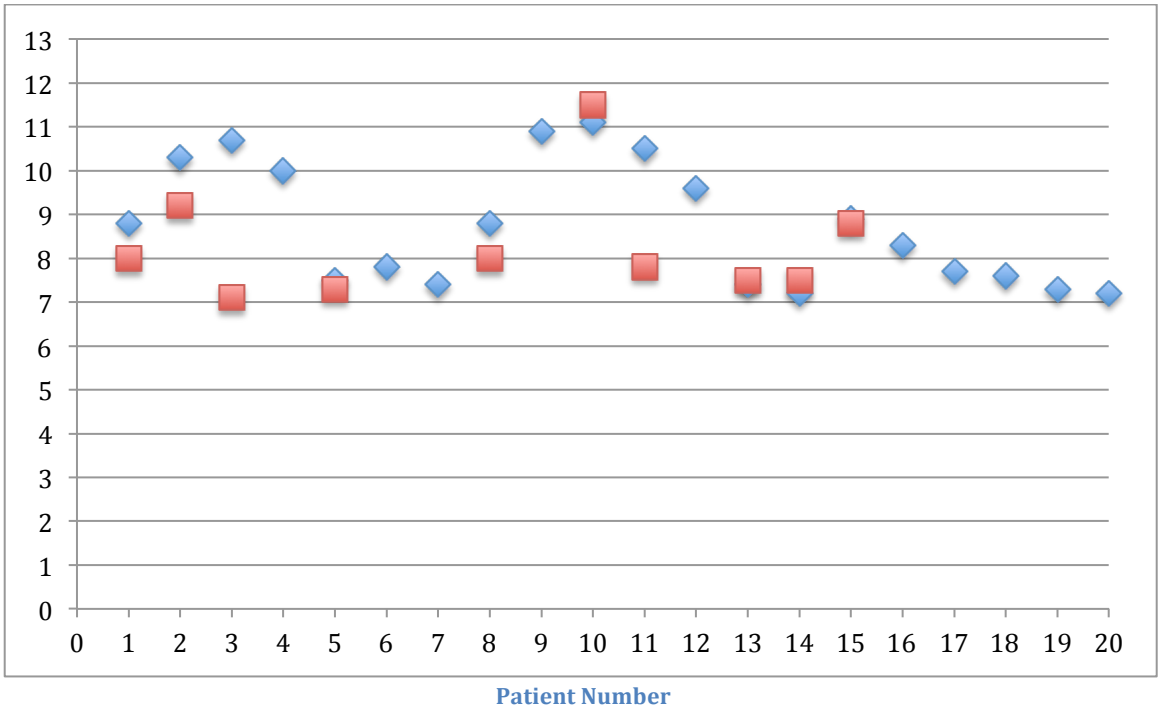
Patient	A1c Pre-	A1c Post-	Change
1	8.8	8.0	-0.8
2	10.3	9.2	-1.1
3	10.7	7.1	-3.6
4	10.0	*	*
5	7.5	7.3	-0.2
6	7.8	*	*
7	7.4	*	*
8	8.8	8.0	-0.8
9	10.9	11.2**	+0.3
10	11.1	11.5	+0.4
11	10.5	7.8	-2.7
12	9.6	*	*
13	7.4	7.5	+0.1
14	7.2	7.5	+0.3
15	8.9	8.8	-0.1
16	8.3	*	*
17	7.7	*	*
18	7.6	*	*
19	7.3	7.3	0
20	7.2	*	*

*No follow-up A1c
**Did not use log book

	Mean A1c	Median A1c	Range of A1cs
Pre-Project	8.75	8.55	7.2-11.1
Post-Project	8.19	7.8	7.1-11.5
Change	-0.56	-0.75	_____

Appendix R: A1cs pre-and post-project

Figure 2



Appendix S: Pre-Project Questionnaire Responses

Question 1: Do you currently check your blood sugar every day?

Yes = 12 patients

No = 7 patients

No response = 1 patient

Question 2: Do you currently write down your blood sugar numbers?

Yes = 7 patients

No = 12 patients

No response = 1 patient

Question 3: How comfortable do you feel using a daily logbook for your diabetes?

(From 1 – very uncomfortable to 10 – very comfortable)

Range = 1-10

Mean = 6.17

Median = 6.0

Appendix T: Post-Project Questionnaire Responses

Question 1: Do you feel that using this logbook has helped you with managing your diabetes?

Yes = 10

No = 1

Did not use logbook = 2

Declined to answer = 1

Lost to follow-up = 6

Question 2: How easy was it for you to use this logbook? (From 1 [very easy] to 10 [very difficult])

Range = 1-10

Mean = 5.5

Median = 7

Appendix U: Construct for Comprehensive T2DM Management